

MODELS OF TIME TRAVEL

A COMPARATIVE STUDY USING FILMS

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APPENDIX I: FILMS REVIEWED

Each of the following film reviews has been reduced to two pages. The first page of each of each review is objective; it includes factual information about the film and a synopsis not of the plot, but of how temporal phenomena were treated in the plot. The second page of the review is subjective; it includes the genre where I placed the film, my general comments and then a brief discussion about which model of time I felt was being used and why. It finishes with a diagrammatic representation of the timeline used in the film.

Note that if a film has only one diagram, it is because the different journeys are using the same model of time in the same way. Sometimes several journeys are made. The present moment on any timeline is always taken at the start point of the first time travel journey, which is placed at the origin of the graph.

The blue lines with arrows show where the time traveller's trip began and ended. They can also be used to show how information is transmitted from one point on the timeline to another.

When choosing a model of time for a particular film, I am not looking at what happened in the plot, but rather the type of timeline used in the film to describe the possible outcomes, as opposed to what happened. For example a double-well timeline may have been how all the characters thought time worked, even if the timeline always converged in the story. They may have been convinced that if a big enough change had been made in the past that the timeline would definitely diverge.

Note that the Internet Movie Database user rating and votes for each film were retrieved from: <http://www.imdb.com> on 20th November 2008.

Army of Darkness (1992)

Director: Sam Raimi.

001

Writing Credits: Sam Raimi, Ivan Raimi.

Production Companies: Dino De Laurentiis Company, Renaissance Pictures,
Introvision International, Universal Pictures.

Distribution: Anchor Bay Entertainment.

Actors: Bruce Campbell (Ash), Embeth Davidtz (Sheila).

Runtime: 96 minutes (director's cut).

The Internet Movie Database User Rating: 7.6/10 45,077 votes

Overview: A man is sucked into a vortex and travels through time and space to England during the Middle Ages. He tries to find the Necronomicon, a book that will help him return to his own time.

Plot Synopsis: At the end of the second of the Evil Dead trilogy, *Evil Dead 2* (1987), Ash is sucked into a vortex and travels through time and space to England during the Middle Ages. He is taken prisoner by the locals and becomes a slave. Eventually they realise he is from the future and send him to find the Necronomicon, a book that will help them and allow him to return to his own time. He retrieves the book, but by incorrectly reciting an incantation, he accidentally awakens the Army of Darkness, who they must all now defeat. He then returns to his own time, but as he does not say the words of the magic potion quite correctly, part of the evil returns with him. On his arrival in the present, nothing seems to have been affected by his changing history.

Genre: Fantasy – Finding Portals.

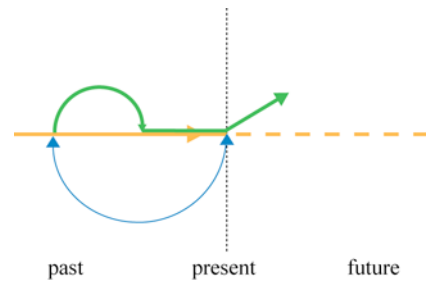
My Comments: The third of the Evil Dead trilogy. The first had no time travel, the second finished with time travel, which is where the third started.

Time Travel Summary: Although Ash significantly changes history, the timeline seems to have converged by the time he returns to his present. As the evil has returned with him, we are led to believe this will cause the timeline to diverge from this point onwards.

Model of Time:

Open past, open future

Converging timeline



Austin Powers: International Man of Mystery (1997)

Director: Jay Roach.

002

Writing Credits: Mike Myers.

Production Companies: Capella International, Eric's Boy, Juno Pix, KC Medien, Moving Pictures, New Line Cinema.

Distribution: New Line Cinema.

Actors: Mike Myers (Austin Powers/Dr Evil), Elizabeth Hurley (Vanessa Kensington), Michael York (Basil Exposition), Mimi Rogers (Mrs Kensington), Robert Wagner (Number Two).

Runtime: 94 minutes.

The Internet Movie Database User Rating: 7.1/10 62,697 votes

Overview: Dr Evil cryogenically freezes himself, so that he can wake 30 years later as an unknown to steal a nuclear weapon and hold the world hostage for 100 billion dollars. Austin chases him through time by also freezing himself.

Plot Synopsis: This Bond movie spoof is set in the 60s, with Austin Powers as the world's coolest photographer and part-time British secret agent. His nemesis, Dr Evil, cryogenically freezes himself, so 30 years later, he can wake as an unknown to steal a nuclear weapon and hold the world hostage for 100 billion dollars. Austin chases him through time by also freezing himself, so that he can stop him when he resurfaces. They both arrive in 1977, but they have 30 years of missing information they need to catch up on to get up to speed.

Genre: Science Fiction - Cryogenic Freezing.

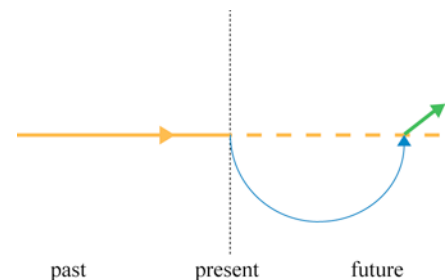
My Comments: The idea is that the cryogenically frozen body of a human is suspended in time until such time it is thawed. The human will wake to find themselves at some point in their future, so technically they will have time-travelled. See also other films with cryogenic freezing, such as *Forever Young* (1992), *Idiocracy* (2006), *Sleeper* (1973), *Demolition Man* (1993) and *Vanilla Sky* (2001).

Time Travel Summary: As neither Austin, nor Dr Evil goes back in time, the past is not changed, but we cannot say if it is changeable or not, so in this film, the past is undefined. However, from the moment they are frozen, they ‘disappear’ from their timeline, which could cause it to diverge away from what it would have been had they stayed. When they are unfrozen in the future, they will awaken on a timeline, but as they have no way of knowing what the events on the original timeline would have been, they cannot say if their disappearance has caused the timeline to diverge or not. It may have diverged away from the original, diverged then converged back to the original, or it may not have changed at all. Backwards time-travel would be required to know this.

Model of Time:

Undefined past, open future

Future timeline



Austin Powers: The Spy Who Shagged Me (1999)

Director: Jay Roach.

003

Writing Credits: Mike Myers.

Production Companies: Eric's Boy, Moving Pictures, New Line Cinema, Team Todd.

Distribution: New Line Cinema.

Actors: Mike Myers (Austin Powers/Dr Evil/Fat Bastard), Heather Graham (Felicity Shagwell), Michael York (Basil Exposition), Robert Wagner (Number Two), Rob Lowe (Young Number Two), Elizabeth Hurley (Vanessa Kensington).

Runtime: 95 minutes.

The Internet Movie Database User Rating: 6.6/10 68,798 votes

Overview: Dr Evil uses his new time machine to travel back 30 years to 1969. Austin follows him back and joins up with Felicity. When she is killed, he travels back ten minutes to save her and then they return to 1999 together.

Plot Synopsis: Dr Evil and the Ministry of Defence have both invented a time machine since we left them two years earlier. Dr Evil has returned from space and uses his time machine to travels 30 years back to 1969 to steal Austin Powers's 'mojo' from his cryogenically frozen body. This is the essence that makes him irresistible to women. Austin travels back in time, where he joins forces with CIA agent Felicity Shagwell, meets his frozen self, and then tracks down Dr Evil in order to recover his Mojo and stop Dr Evil from taking over the world. In the process, Felicity is killed, so Austin travels back ten minutes in time and joins forces with himself to save her. They then return through a time portal to 1999.

Genre: Science Fiction - Cryogenic Freezing and Transporting Body Through Time.

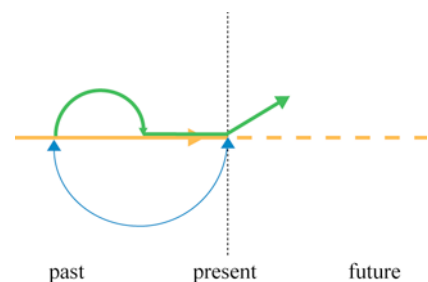
My Comments: Dr Evil goes back in time to steal Austin's mojo, so that he can become irresistible to women, so he is not really trying to change the past, rather he is trying to steal something from the past to bring back to the present. So he must believe that the timeline will converge after his departure, so that he will be able to return to the same present that he left. Either that or he believes in a model of time with a double-well timeline and that removing Austin's mojo is not a major enough event to cause the timeline to diverge.

Time Travel Summary: When Austin goes back ten minutes in time, he is trying to change the past by preventing Felicity's death, more because he fancies her, than because he is trying to restore the timeline. This is confirmed by the fact that he chooses to return to the present with her because she is now missing from the timeline and that would surely cause it to diverge in a double-well model. It clearly did not, therefore this film is using a converging model of time. The past is clearly open, and the future must be open too, as he will now share a new future with Felicity.

Model of Time:

Open past, open future

Converging timeline



Austin Powers in Goldmember (2002)

Director: Jay Roach.

004

Writing Credits: Mike Myers.

Production Companies: New Line Cinema, Gratitude International, Team Todd, Moving Pictures.

Distribution: New Line Cinema.

Actors: Mike Myers (Austin Powers/Dr Evil/Goldmember/Fat Bastard), Beyonce Knowles (Foxy Cleopatra), Seth Green (Scott Evil), Michael York (Basil Exposition), Robert Wagner (Number Two), Michael Caine (Nigel Powers).

Runtime: 94 minutes.

The Internet Movie Database User Rating: 6.2/10 55,583 votes

Overview: Austin visits Dr Evil in prison to ask where he has hidden his father. Dr Evil says not where but when, as he has hidden him in time! Austin Powers then goes back in his time machine car to rescue his father.

Plot Synopsis: Dr Evil is sentenced to a maximum-security prison for 400 years. However, he arranges for Austin's father, Nigel Powers, who is also a British spy, to be kidnapped and hidden. Austin visits Dr Evil in prison to ask where Nigel has been hidden. Dr Evil says not where, but when, as he is hidden in time! In exchange for information, he asks to be transferred to a normal prison, so he can be with his beloved Mini Me. Austin agrees and is told that his father is being held at Goldmember's Club 69 in New York City, but back in 1975. Austin Powers travels back in his time machine car (more like a pimp mobile than a DeLorean) and rescues Nigel, with the help of undercover agent, Foxy Cleopatra. However, Goldmember recaptures Nigel and returns with him to 2002 in Dr Evil's time machine. Austin and Foxy use the pimp mobile to also return to 2002, when they discover that Dr Evil has escaped from prison and has a new lair close to Japan, where he is planning his next evil operation with Goldmember. Austin and Foxy go there to save Nigel and save the world!

Genre: Science Fiction – Time Travel Vehicle and Transporting Body Through Time.

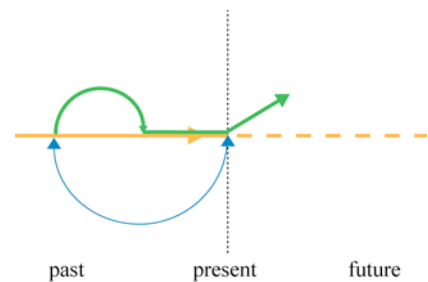
My Comments: Dr Evil's time machine transports a body through time, whereas Austin Powers' time machine car carries its occupants through time. The first film of the trilogy dealt changing the future, the second with changing the past. This one deals with not trying to change either, but rather with using a time machine to hide someone in another time, thus making them harder to find.

Time Travel Summary: Dr Evil kidnaps Nigel and hides him in 1975, so he must believe that the timeline will converge whatever changes he makes to the past, so that the present remains unaffected by these actions. The past is therefore open and converges. Since Austin has brought Foxy with him to 2002, he will now have a different future with her compared to the future he would have had if he had not brought her back, so the future must be open.

Model of Time:

Open past, open future

Converging timeline



Back To The Future (1985)

Director: Robert Zemeckis.

005

Writing Credits: Robert Zemeckis, Bob Gale

Production Company: Amblin Entertainment, U-Drive Productions, Universal Pictures.

Distributor: Universal Pictures.

Actors: Michael J. Fox (Marty McFly), Christopher Lloyd (Dr Emmett Brown).

Runtime: 117 minutes.

The Internet Movie Database User Rating: 8.3/10 153,867 votes

Overview: Doc Brown sends Marty back 30 years in time in a DeLorean car time machine to 1955, the time when his parents are about to get together. The younger Doc Brown helps Marty get 'back to the future'.

Plot Synopsis: Doc Brown converts a DeLorean car in such a way that when it reaches a speed of 88 mph, it is able to travel through time. He programs it for 1955 and Marty goes back 30 years to the time when his parents are about to get together. His presence causes his mother to fall in love with him, instead of his father. He has to correct the distorted events of the past by getting his parents back together; otherwise he will cease to exist! Marty then tracks down the younger Doc Brown to help him get back to the future, hence the title of the movie. They know when a bolt of lightning will strike the town hall and are able to utilise its energy to power the car, as they do not have access to any plutonium.

Genre: Science Fiction – Time Travel Vehicle.

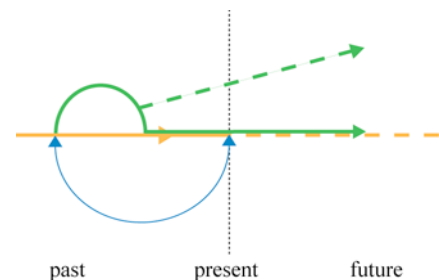
My Comments: A new timeline is created the moment Marty arrives, which replaces the old timeline from that point on. The old timeline collapses and ceases to exist. So, he is worried that if he distorts history enough, he will create a significantly different future, one where he might not even be born! So he spends the whole movie trying to avoid causing a grandfather paradox. As no significant changes are made to the past, we never find out if this will cause the future to be changed.

Time Travel Summary: The model of time used in this film is different from what actually happens: both Doc and Marty believe that the timeline will converge back to the original if they do not make a significant change. So they are careful not to do so and when Marty returns home, nothing has changed, which means the timeline must have converged back. So it could be said that this film is using a converging model of time, but Doc and Marty are making decisions based on the fact that if they are not careful, they could cause the timeline to diverge for good. Therefore the past and future are open, as a double-well timeline is being used.

Model of Time:

Open past, open future

Double-well timeline



Back To The Future Part II (1989)

Director: Robert Zemeckis.

006

Writing Credits: Robert Zemeckis, Bob Gale.

Production Company: Amblin Entertainment, U-Drive Productions, Universal Pictures.

Distributor: Universal Pictures

Actors: Michael J. Fox (Marty McFly), Christopher Lloyd (Dr Emmett Brown).

Runtime: 108 minutes.

The Internet Movie Database User Rating: 7.4/10 67,008 votes

Overview: Old Biff makes a return trip back to 1955, where he hands his younger self a sports almanac. This creates a new timeline, replacing the old one. Marty and Doc decide to go back to 1955 to stop Biff.

Plot Synopsis: In this sequel, Doc Brown uses his DeLorean time machine car to travel to 30 years forward to the future and finds Marty and his girlfriend Jennifer are now happily married, but their children are about to go to jail. He comes back to 1985 and collects Marty and Jennifer to take them back to the 2015 to sort out the mess. Soon after they arrive, they are recognised by Biff, who is now an old man. He steals their DeLorean car and travels back sixty years to 1955, where he hands his younger self a sports almanac containing all the sports statistics until the end of the century. By winning millions on gambling, Young Biff distorts the time-space continuum creating a new timeline, which turns their hometown in 1985 into a living hell. When Doc and Marty return there, they soon realise what has happened and decide to go back to 1955 to prevent Old Biff giving the almanac to Young Biff. As they are about to return to the future, lightning strikes the car causing its time dial to malfunction and Doc Brown and his car are transported to 1885, leaving Marty stranded in 1955. A lawyer then appears and gives a letter to Marty, which the Doc had written back in 1885. It explains where he has hidden the time machine car, so that Marty can use it to get back to 1985.

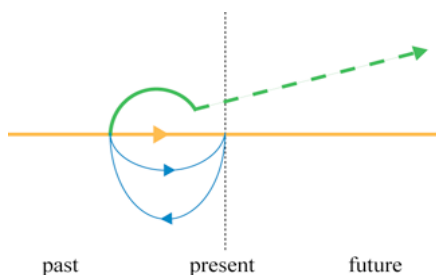
Genre: Science Fiction – Time Travel Vehicle.

My Comments: Soon after Doc and Marty arrived in the living hell on the alternate timeline in 1985, Doc used a diagram of a branching timeline to explain to Marty that at the point when Biff came back, a new branch of the timeline must have been created. If the original timeline were to have immediately collapsed, then the Doc and Marty would have disappeared for good along with that timeline, so the new timeline could not have formed immediately on Old Biff's arrival. It must have formed when a significant event had taken place, which caused the original timeline to disappear and be replaced by the new diverging one.

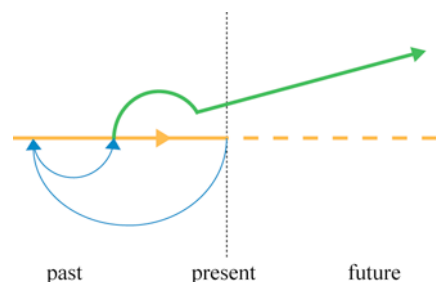
Time Travel Summary: As soon as Old Biff arrives in 1955, the timeline diverges slightly from the original one. However, it soon starts to converge back towards the original because Young Biff does not make any bets using the almanac, which means at this point, Doc and Marty are safe further along this timeline and Old Biff is able to return to 2015. Young Biff though now has the potential to win millions, and when he does this, it is a significant enough event to cause the timeline to diverge away to a completely different future. Hence this film uses a double-well timeline, as shown in the first diagram below. Another example of this is at the beginning of the film when Doc travels back from 2015 to 1985 to pick up Marty. They then travel forward to just before the events that Doc has witnessed. They eventually prevent Marty's children from going to jail, which means they have caused the timeline to diverge as shown in the second diagram below. This shows that the past and future are changeable, but only if a change is significant enough, hence the double-well timeline.

Model of Time: Open past, open future with a double-well timeline.

Old Biff returns to 2015 before the divergence occurs:



Doc travels back from 2015 to 1985 and then to just before the event he left:



Back To The Future Part III (1990)

Director: Robert Zemeckis.

007

Writing Credits: Robert Zemeckis, Bob Gale.

Production Company: Amblin Entertainment, U-Drive Productions, Universal Pictures.

Distributor: Universal Pictures.

Actors: Michael J. Fox (Marty McFly), Christopher Lloyd (Dr Emmett Brown), Mary Steenburgen (Clara Clayton).

Runtime: 118 minutes.

The Internet Movie Database User Rating: 7.0/10 59,462 votes

Overview: Marty was trapped in 1955 until he received a letter from Doc Brown written in the Wild West of 1885 with instructions on how to escape. He succeeds and then goes travels back in the DeLorean to save the Doc's life.

Plot Synopsis: Marty, now trapped in 1955, receives a letter from Doc Brown written in 1885 from the Wild West with instructions on how to find the time machine. He succeeds and goes back to 1885 and saves the Doc's life. Marty is careful not to do anything that will alter the course of events through time because when he goes back to 1985, he does not want the timeline to have changed. When they are ready to return, they have to address the fact that the DeLorean time machine has run out of petrol, so they use a stolen steam train to push it to the required speed. At the last minute, Doc decides to stay with his girlfriend, but Marty gets in the car and returns to 1985. Just after he gets out of the car, it is completely destroyed by an oncoming cargo train, which puts an end the time-travelling adventure once and for all!

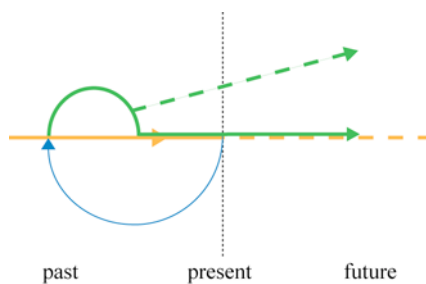
Genre: Science Fiction – Time Travel Vehicle.

My Comments: This movie returns to the premise used in the first movie, where one has to be careful not to change too much, or the timeline will diverge forever, which could cause the grandfather paradox and prevent Marty from being born. However, I am not sure how Doc staying in the past and marrying will not have consequences in the future. This brings us to another issue: How much do you have to change the past to make a significant difference in the future? This issue is addressed more deeply in the review of *Déjà Vu* (2006) where the double-well model of time is discussed more fully.

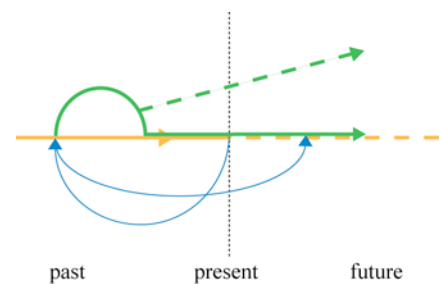
Time Travel Summary: The double-well timeline is used again in this final film of the trilogy. Marty and Doc do not do anything significant enough to cause the timeline to diverge so far that it cannot converge back to the original, so Marty is able to return to the same 1985 that he left. The timeline is the same for both: they both start in 1955 and travel to 1885, except that at the end, Marty travels to 1985 and Doc stays in 1885 to live out his life.

Model of Time: Open past, open future with a double-well timeline.

Doc:



Marty:



Biggles (1986)

aka *'Biggles: Adventures in Time*

Director: John Hough.

008

Writing Credits: W.E. Johns (characters), John Groves (screenplay).

Production Companies: Compact Yellowbill, Tambarle.

Distribution: New Century Vista Film Company.

Actors: Neil Dickson (James 'Biggles' Bigglesworth), Alex Hyde-White (Jim Ferguson), Fiona Hutchison (Debbie), Peter Cushing (Colonel William Raymond).

Runtime: 108 minutes.

The Internet Movie Database User Rating: 5.5/10 835 votes

Overview: An American businessman and his 'time-twin', a WWI fighter pilot find themselves slipping backwards and forwards through a hole in time when one or the other is in mortal danger.

Plot Synopsis: Jim is a young American businessman, who finds himself sporadically slipping backwards and forwards through a hole in time. He always arrives next to his 'time-twin' James 'Biggles' Bigglesworth, who is a WWI fighter pilot. Biggles' superior officer, Colonel William Raymond (Peter Cushing) explains, "Apparently, the hole in time goes both ways. It opens when one or the other is in mortal danger." Jim never knows when he will move from one world to the other, but a bolt of lightning usually accompanies the time travel. Anyone or anything that he happens to be touching at that moment gets transported through time with him.

Genre: Fantasy – Portals.

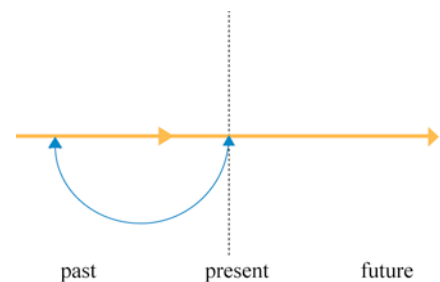
My Comments: There are two time-travellers, one making return trips to the future and the other return trips to the past. Each trip, they are helping to save the other's life, so their trips are significant in terms of causing the timeline to diverge away from the original for good!

Time Travel Summary: When Jim makes a return trip to the past, he always arrives back to an unchanged present, even though he has altered the past by helping to save Biggles' life. If using a model of time with a double-well timeline, this action would be a significant enough event to cause the timeline to diverge. Therefore a model of time with a converging timeline is more likely, as the timeline always converges after Jim makes a return trip to the past. It is clear from Jim's trips that the past is open. Biggles, on the other hand, starts his trips in Jim's past and only makes return trips to Jim's present. He is able to change Jim's future by saving his life each time, so we can say that the future is open, as Biggles appears to be changing it. A more likely possibility is that these trips are causal loops: each trip was meant to be and will always be that way, so nothing is being changed, as there is a fixed past and future with no divergence of time. If Jim's era is taken to be the present, then both Jim and Biggles would travel along the following timeline as shown.

Model of Time:

Closed past, closed future

Fixed timeline with causal loop



Bill & Ted's Excellent Adventure (1989)

Director: Stephen Hereck.

009

Writing Credits: Chris Matherson, Ed Solomon.

Production Company: De Laurentiis Entertainment Group (DEG), De Laurentiis Film Partners, Interscope Communications, Nelson Entertainment (presents), Soisson/Murphey Productions.

Distributor: Orion Pictures Corporation.

Actors: Keanu Reeves (Ted Logan), Alex Winter (Bill S. Preston, Esq.).

Runtime: 90 minutes.

The Internet Movie Database User Rating: 6.7/10 24,364 votes

Overview: Bill and Ted travel backwards through time in a telephone box, kidnapping famous people from the past to bring them back to the present to be part of their high school history presentation.

Plot Synopsis: Rufus travels back from the future in a telephone box to convince two teenagers, Bill and Ted, that they have a crucial role to play in the future of mankind! They must travel backwards through time in one of these phone boxes, kidnapping famous people from the past (Socrates, Napoleon, Billy the Kid, Joan of Arc, Abe Lincoln, etc.) and bring them all back to the present to be part of their high school history presentation, which they need to pass with an A-grade. If not, Ted will have to leave town to attend military school and they will not be able to form their band, Wyld Stalyns so they can make a real impact on the world.

Genre: Science Fiction – Time Travel Vehicle.

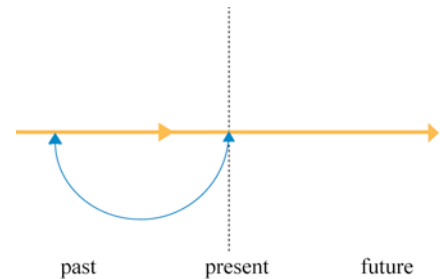
My Comments: Rufus comes back from the future to change our present, though from his point of view, he begins in the present and arrives in the past.

Time Travel Summary: If Rufus had not made the trip, then the Wyld Stalyns would not have formed and the timeline would not have followed the same path. So without his intervention in the past, the world he came from would not have existed. This creates a predestination paradox. So it seems that he was always meant to come back and intervene because without the help of his time machine, it is extremely unlikely that the boys would have gained an A-grade in their high school history presentation. The timeline is therefore fixed with a causal loop.

Model of Time:

Closed past, closed future

Fixed timeline with causal loop



Bill & Ted's Bogus Journey (1991)

Director: Peter Hewitt.

010

Writing Credits: Chris Matherson, Ed Solomon.

Production Companies: Interscope Communications, Nelson Entertainment.

Distributor: Orion Pictures Corporation.

Actors: Keanu Reeves (Ted Logan), Alex Winter (Bill S. Preston, Esq.).

Runtime: 93 minutes.

The Internet Movie Database User Rating: 5.7/10 16,395 votes

Overview: Robot versions of Bill & Ted travel back in time and kill the original boys. They replace them, thus changing the course of the future. The guys have to overcome the Grim Reaper to come back and save the world!

Plot Synopsis: In the distant future, an evil maniac called De Nomolos creates robot versions of Bill & Ted. He sends the doppelgangers back to the present using a stolen phone box time machine to kill the original pair and replace them. He wants to alter the present to create a more favourable future for himself. Once the boys realise they are dead, they find a way to bring themselves back to life by outwitting the Grim Reaper. They then rescue their girlfriends and take them in a time machine to another time and place, where they marry, have children and become highly skilled musicians. They return to the present at the instant after leaving and therefore win the Battle of the Bands, so that the future reverts to the original one described in the previous film.

Genre: Science Fiction – Time Travel Vehicle.

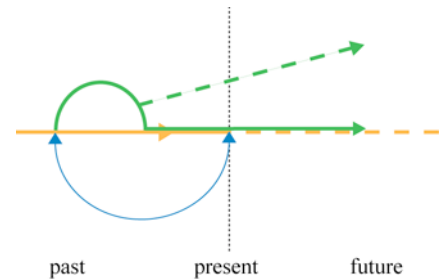
My Comments: This film brings up the question about the afterlife existing in a timeless world parallel to ours. However, the narrow scope of this work prohibits me from discussing this topic! Also the boys travelled to another time and place, where they became expert musicians. We are not told whether this was the future or past, or whether it was it another parallel universe. So I am going to analyse what is known, the movements of De Nomolos starting in his present.

Time Travel Summary: De Nomolos travels back in time and changes the timeline by having Bill and Ted killed, so the past is open. This film uses a double-well timeline because the presence of De Nomolos is not enough to change destiny. He needs to kill the boys, before the timeline can diverge forever. However, he does not count on the boys coming back from death, which causes the timeline to converge back, so that the original future is restored.

Model of Time:

Open past, open future

Double-well timeline



Black Knight (2001)

Director: Gil Junger.

011

Writing Credits: Darryl Quarles, Peter Gaulke.

Production Companies: Twentieth Century-Fox Film Corporation, Regency Enterprises, New Regency Pictures, Runteldat Entertainment, The Firm, Epsilon Motion Pictures.

Distribution: Twentieth Century-Fox Film Corporation.

Actors: Martin Lawrence (Jamal Walker/Skywalker), Marsha Thomason (Victoria the Chambermaid/Nicole), Tom Wilkinson (Sir Knolte of Marlborough).

Runtime: 95 minutes.

The Internet Movie Database User Rating: 4.2/10 9,711 votes

Overview: A worker at an amusement park falls into the moat of a fake medieval castle and when he resurfaces, he finds himself swimming in lake in England in 1328. He uses the same lake to return home at the end.

Plot Synopsis: Jamal is a worker at an amusement park. He falls into the moat of a fake medieval castle and when he surfaces, he finds himself swimming in an English lake in 1328. At first, he thinks he is at a theme park and all the characters are actors, until he realises his fate. After an adventure, he dives in to the lake he came out of and which returns him to his century. A changed man with a better attitude, he meets Nicole, who looks like Victoria the chambermaid, who he fell in love with in medieval times.

Genre: Psychological – Head Injury.

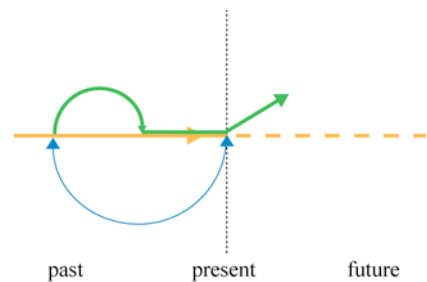
My Comments: Another film adapted from the 1889 Mark Twain novel, *A Connecticut Yankee In King Arthur's Court*.

Time Travel Summary: Jamal changed the course of history while he was in the past, but on his return, the world around him appeared unchanged, so the timeline must have converged back. Soon after returning, when he meets Nicole, he acts differently to how he would have, if he had never met Victoria, so we can say his future is changing as a result of his trip and is therefore open.

Model of Time:

Open past, open future

Converging timeline



The Butterfly Effect (2004)

Director: Eric Bress & J. Mackey Gruber.

012

Writing Credits: J. Mackey Gruber, Eric Bress.

Production Company: BenderSpink, FilmEngine, Katalyst Films.

Distributor: New Line Cinema.

Actors: Ashton Kutcher (Evan Treborn), Melora Walters (Andrea Treborn), Amy Smart (Kayleigh Miller), William Lee Scott (Tommy Miller), Eric Stoltz, (Mr Miller), Elden Henson (Lenny Kagan).

Runtime: 120 minutes (director's cut).

The Internet Movie Database User Rating: 7.8/10

76,791 votes

Overview: A young man learns to re-experience his past when in a trance. When he comes out of the trance, he finds that each small change he has made can have enormous consequences in the present!

Plot Synopsis: Evan is a young boy, who suffers from memory blackouts when experiencing traumatic events. His therapist asks him to keep a diary of these moments, so he can remember what happens. When he is a young adult, he starts to read one of his old diaries and falls into a trance where he begins to re-experience the event with his adult point of view. He finds that he can change the past for the better, so that when he comes out of the trance, this small significant change in his past has had enormous consequences for his present! Evan's father had the same ability, but was committed to a mental home. He tries to warn his Evan that the more attempts that are made to fix the mistakes of the past, the more problems that are created in the present. It seems this genetic defect is passed down from father to son. At the end of the film, to prevent himself from also going mad, he goes back to the womb and strangles himself with the cord, before he can be born. His mother had had two stillbirths before him, so presumably these sons had gone back and also committed suicide in the same way. The story ends with the lives of his childhood friends, Lenny, Kayleigh and Tommy turning out much better without him being born; his mother even gives birth to a baby, who cannot have the genetic defect because she is a girl.

Genre: Psychological – Psychosis.

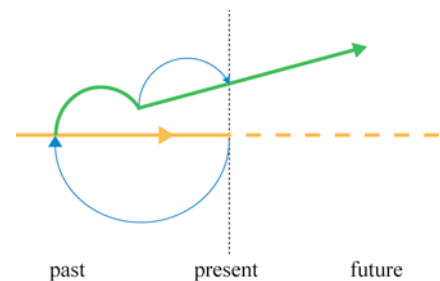
My Comments: The original cinema release of this film had a different ending: Evan goes back to the point when he and Kayleigh first met as children. He threatens to harm her and her family if she ever talks to him again. This causes the timeline to diverge such that Kayleigh and her brother, Tommy, do not have to grow up living with their evil father and that their friend, Lenny, grows up without being bullied. They all go on to live happy well-adjusted lives. The film ends when eight years later, Kayleigh and Evan pass on a street with a feeling of déjà vu, but keep walking. Rutgers biophysicist Troy Shinbrot says, "If [Evan] had a better model for the system that is his life, perhaps he could have chosen better outcomes. But then the movie would not be very interesting."¹ Successfully changing the past, but making things worse in the future is also the theme of the film, *Retroactive* (1997).

Time Travel Summary: When Evan travels back, he easily makes changes, so the past is open. When he returns to his present, the timeline has strongly diverged. This would suggest an open past, open future model of time with a diverging timeline, however on one occasion, he went back in time, did not change much and on his return, nothing had changed, so it seems a double-well timeline was being used in this film.

Model of Time:

Open past, open future

Double-well timeline



¹ Chodos, A. (2004). Butterflies, Tornadoes, and Time Travel. Retrieved 12 Apr 2009, from <http://www.aps.org/publications/apsnews/200406/butterfly-effect.cfm>

The Butterfly Effect 2 (2006)

Director: John R Leonetti.

013

Writing Credits: Michael D. Weiss.

Production Companies: New Line Cinema, FilmEngine, BenderSpink.

Distribution: New Line Cinema.

Actors: Eric Lively (Nick Larson), Erica Durance (Julie Miller), Dustin Milligan (Trevor Eastman), Gina Holden (Amanda).

Runtime: 92 minutes.

The Internet Movie Database User Rating: 4.4/10 6,853 votes

Overview: A young man is able to relive the moments leading up to an event in a schizophrenic episode. He makes different decisions and when he wakes from the episode, everything has changed!

Plot Synopsis: Nick loses his two best friends, Trevor and Amanda, and also his pregnant girlfriend, Julie, in a car accident, which only he survives. A year later, when looking at a photo that was taken just before the accident, he experiences a schizophrenic episode and is able to relive the moments leading up to the event. He makes different decisions and when he wakes from the episode, everything has changed: they are all still alive and in his life. However, he now finds that his work is not going so well, so he decides to go back in time and change the relationship he has with his supervisor. He does this, but when he returns, he has lost his girlfriend and is living the life of a financially successful, but lonely bachelor. Many things are very different when returning to the present. Each time he goes back to fix something, it ends up worse overall. It seems his father had the same abilities, with the same problems and ended up in a mental institution, eventually committing suicide. In the end, Nick goes back to relive the earliest scene of the movie. In order to save his pregnant girlfriend from the same car accident, he drives another vehicle over a cliff, which saves her life, but kills him. When she later gives birth, she names the baby after him. We can see when the baby looks at a photo and it begins to shake that he has the same abilities as both his father and grandfather.

Genre: Psychological – Psychosis.

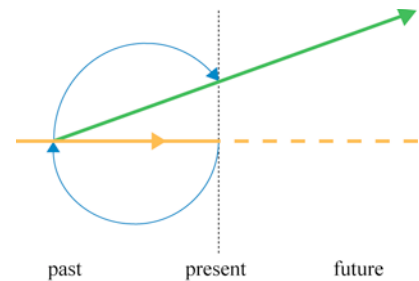
My Comments: The butterfly effect is when you change one small thing and it can sometimes have a potentially big knock-on effect, but not always. In this film however, every time Nick went back in time, it caused a large divergence to the timeline.

Time Travel Summary: When Nick travels back, he easily makes changes, so the past is open. When he returns to his present, the timeline has always strongly diverged. This suggests an open past, open future model of time with a diverging timeline because every time he goes back in time, no matter what he does, the timeline strongly diverges. The timeline did not always diverge in the original film, as you would expect when using a model of time with a double-well timeline.

Model of Time:

Open past, open future

Diverging timeline



***Cashback* (2006)**

Director: Sean Ellis.

014

Writing Credits: Sean Ellis.

Production Companies: Left Turn Films, Lipsync Productions, Ugly Duckling Films.

Distribution: Magnolia Pictures.

Actors: Sean Biggerstaff (Ben Willis), Emilia Fox (Sharon Pintey).

Runtime: 102 minutes.

The Internet Movie Database User Rating: 7.5/10 13,352 votes

Overview: A teenage student, who is working a night shift at a supermarket, learns to stop time using the power of his mind. He can walk around the shoppers frozen in time and start time again by simply clicking his fingers.

Plot Synopsis: First-year art student, Ben, breaks up with his girlfriend and cannot sleep, so he gets a job at a supermarket. The art of making his nightshift go faster is to imagine the opposite: that time has slowed right down to the point where it those around him have been paused or frozen. In this paused world, he can walk freely and unnoticed. He says, "Nobody would even know time had stopped. And when it started back up again, the invisible join would be seamless except for a slight shudder, not unlike the feeling of someone walking over your grave." He undresses women while they are paused and sketches their naked bodies in the supermarket aisles. He moves the bodies around and when he is ready, all he has to do to start time again is to click his fingers. He can also slow down time to slow motion. He says, "I often wonder what it would be like to spend the rest of my life with the world on pause: To live out the rest of my life between two fractions of a second." After four weeks without sleep, he says that the experience "had done nothing to slow the effects of time ... the days joined the fast-flowing river of time. The bad news is that time flies – the good news is that you are the pilot!" He also observes that, "You can speed it up, you can slow it down, but you cannot rewind time. You cannot undo what is done." While kissing his new girlfriend, Sharon, he stops time so they can then both move around the paused world together. He says to her, "Love is there if you want it to be, you just have to see that it is wrapped in beauty and hidden away between the seconds of your life. If you do not stop for a minute, you might miss it."

Genre: Psychological – Mind Power.

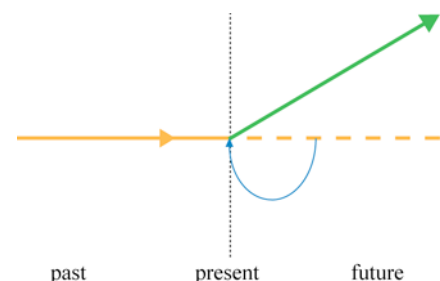
My Comments: Ben is slowing time down for those around him, but not for himself. This is highly unlikely because if he was moving through the dimension of time faster than the others (his clock was ticking faster than theirs), according to relativity, you would expect him to be moving through space more slowly. However, he is moving much faster through space, as they are all frozen (or moving extremely slowly) relative to him. By freezing those around him, he is aging, while they are not, so this is the opposite of cryogenic freezing, which is a form of future time travel. At one point, he discovers that he is not the only one who can stop time, like in the movie, *Clockstoppers* (2002). Similar concepts are discussed in the film reviews of *A Matter of Life and Death* aka 'Stairway to Heaven' (1946) and *Lost Horizon* (1937).

Time Travel Summary: As Ben's clock is ticking slower than those around him, he is moving backwards in time relative to them. As the time gap between them increases, he is aging faster than them and hence faster than he would have done, if he had not changed time. So when he clicks his fingers, he is going backwards in time to the point when the freezing began, but never back beyond this moment. Therefore nothing from his past can change due to these timeouts. As he never goes to his past, we would assume the past is undefined, however when he says, "You cannot undo what is done," he is referring to the actions that passed before the freezing began. So the model of time used in this film has a closed past. After he returns, he is creating a different future for the others by the things he has done to them during the frozen period, which causes their future timeline and also his to diverge. In the following diagram, the time freezing begins at the origin and then he skips back to the point when it begun and rejoins those around him on a new diverging timeline.

Model of Time:

Closed past, open future

Diverging timeline



A Christmas Carol (2004)

Director: Arthur Allan Seidelman.

015

Writing Credits: Charles Dickens (novel), Mike Ockrent (musical).

Production Companies: Entertainment Partners Ltd.

Distribution: National Broadcasting Company.

Actors: Kelsey Grammer (Scrooge), Jason Alexander (Jacob Marley), Jennifer Love Hewitt (Emily).

Runtime: 97 minutes.

The Internet Movie Database User Rating: 6.0/10 506 votes

Overview: Three ghosts visit Scrooge on Xmas Eve: one takes him back in time to review his life. The other two take him forward in time to view his probable future. He comes back knowing he must change his ways!

Plot Synopsis: On Christmas Eve, many ghosts covered with chains arrive to show Scrooge how he could end up. They disappear and when the clock strikes one, the ghost of Xmas past appears in the form of a beautiful blonde angel. She takes him back in time to review all of the key moments of his past that shaped his life, and made him into whom he is now. She tells him that to understand the present, he must learn from the past. He falls back to sleep, but is woken by the clock striking two. He goes into the next room and meets the ghost of Xmas present, who takes him a few hours into the future on a tour of his neighbourhood on Xmas Day. He finds out what is really going on around him and sees things that he had never before chosen to see. When the clock strikes three, a knocking on the front door wakes him. An old lady in black enters, and transforms into the ghost of Xmas yet to be. She takes him forward in time to a graveyard. "Your future is here", she says, "Listen to the footsteps of the people that will be dancing on your grave!" He is shocked when he reads the epitaph on his gravestone. She throws a cloak over him and when he removes it, he is back in his house and the sun has risen on Xmas morning. All of the time travelling is done in that one evening. We see Scrooge as a changed man, happily celebrating Xmas with his friends and relatives.

Genre: Psychological – Visions or Dreams.

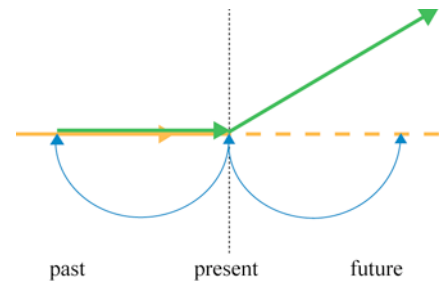
My Comments: Based on an 1843 Charles Dickens novel of the same title. Although there were many film versions of this book, they all used the same model of time, so I felt it only necessary to review one of them. A list of all of the other versions appears Appendix II - Unreviewed Films.

Time Travel Summary: Scrooge travelled to his past and stood in the room with the ghost watching, but they could not be seen, nor could he change anything. So the past is closed and was not affected by his presence. He also travelled to his probable future to observe it. On his return to his present, he begins to change his behaviour, which causes the timeline to diverge towards a new and different future.

Model of Time:

Closed past, open future

Diverging timeline



Click (2006)

Director: Frank Coraci.

016

Writing Credits: Steve Koren, Mark O'Keefe.

Production Companies: Columbia Pictures Corporation, Happy Madison Productions, Revolution Studios, Original Film, Road Rebel.

Distribution: Sony Pictures Entertainment.

Actors: Adam Sandler (Michael Newman), Kate Beckinsale (Donna Newman), Christopher Walken (Morty).

Runtime: 107 minutes.

The Internet Movie Database User Rating: 6.8/10 56,302 votes

Overview: A man is given a free universal remote control, which he finds he can use to pause his life, view his past or future, or even use it to select a commentary on his life! However, he is not able to use it to change his past.

Plot Synopsis: Michael goes shopping for a universal remote at a department store and meets the salesman, Morty, who gives him one for free. When he gets home, he finds he can use it to go backwards, pause, or go forwards through time viewing his life. Morty shows up from time to time and explains that he cannot go back and change anything; he can only rewind to scenes of his life in which he was present and view them, like watching a film on a DVD. He and Marty are never noticed as they walk around the scenes of his life. He fast-forwards various to parts of his life and eventually finds that he has become very successful, but his wife and kids have left him and she is now remarried. He is rich, successful and very overweight. He has to be careful what he asks for because the remote starts to remember commands and repeat them. It jumps him forward in time when he is not expecting it because that is what he asked it to do when he was in a similar situation last time. He sees how of much of his personal life he missed and how his life is going from bad to worse. At the end of the movie, he wakes up on one of the department store's beds, back in the present, thinking it was all a bad dream, until he gets home and sees the remote. He then realises that Morty was an angel bringing him a warning, so he starts to make his family a priority, thus creating a different future for himself.

Genre: Psychological – Angels.

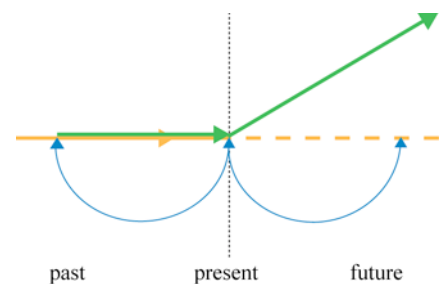
My Comments: The Fast Forward button shows Michael his likely future and the only way he can change that is to return to the present and make changes to his life there. The morals of the plot and model of time used are very similar to Dickens' book, *A Christmas Carol* and all of the films based on this book.

Time Travel Summary: Michael can view his past, but is not able to make changes to it, as it is closed. He also travels to his probable future to observe it, but cannot change it while there. On his return to his present, he begins to change his behaviour, which causes the timeline to diverge towards a new and better future.

Model of Time:

Closed past, open future

Diverging timeline



***Clockstoppers* (2002)**

Director: Jonathan Frakes.

017

Writing Credits: Rob and Andy Hedden.

Production Companies: Paramount Pictures, Nickelodeon Movies, Valhalla Motion Pictures, Pacific Western.

Distribution: Paramount Pictures.

Actors: Jesse Bradford (Zak Gibbs), French Stewart (Dr Earl Dopler), Paula Garcés (Francesca), Michael Biehn (Henry Gates), Robin Thomas (Dr Gibbs).

Runtime: 94 minutes.

The Internet Movie Database User Rating: 5.0/10 5,122 votes

Overview: A teenager finds a special wristwatch, (molecular accelerator) which when turned on, causes time to speed up for him such that those around him move so slowly that they seem like statues.

Plot Synopsis: Zak Gibbs finds a special wristwatch, which is really a molecular accelerator. He puts it on and it sends him into hypertime: His time, relative to those around him speeds up so that those around him move so slowly that they seem like statues. When he switches off the clock, his time slows down again so that it matches theirs. However, he has aged considerably more than the others and because he has been travelling backwards in time relative to them. The advantages are that he is able to move around unseen by others because although he only feels like he is moving normally, relatively he is moving too fast to be seen! Also, when he switches on the wristwatch, anyone touching him at that moment is also sent into hypertime. He soon realises that he does not have the only molecular accelerator and that there are others also in hypertime. All the watches end up being confiscated by government agents.

Genre: Science Fiction – Hand-held Time Travel Device.

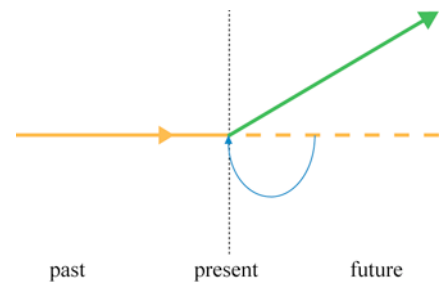
My Comments: If a man’s personal clock is ticking faster than those around him, this will cause him to age faster than them because he is moving backwards in time relative to them. This concept is also discussed in the film reviews of *A Matter of Life and Death* (1946), *Cashback* (2006) and *Lost Horizon* (1937).

Time Travel Summary: Although Zak is travelling backwards in time, he can never travel back beyond the moment the molecular accelerator begins, so his past cannot be changed. But he cannot know it to change his past, so his past is undefined. He is creating a different future for the others by the things he does to them during the frozen period, which causes the future timeline to diverge. In the following diagram, the time freezing begins at the origin and then Zak skips back to the point when it began and rejoins those around him on a new diverging timeline.

Model of Time:

Undefined past, open future

Diverging timeline



A Connecticut Yankee In King Arthur's Court (1949)

Director: Tay Garnet.

018

Writing Credits: Mark Twain (novel), Edmund Beloin.

Production Companies: Paramount Pictures.

Distribution: Paramount Pictures.

Actors: Bing Crosby (Hank Martin), Rhonda Fleming (Alisande).

Runtime: 106 minutes.

The Internet Movie Database User Rating: 6.6/10 679 votes

Overview: In 1912, a man is riding his horse in a storm, when he is struck across the head by a falling branch. He and his horse are transported across space and time to England in the time of King Arthur and Merlin.

Plot Synopsis: Hank Martin works as a mechanic and blacksmith in Hartford, Connecticut in 1912. He is riding his horse in a storm, when he is struck across the head by a falling branch. When he comes to, he is confronted by a knight in shining armour, who believes him to be a beast. He soon realises that he and his horse have been transported somehow across space and time to England in A.D. 528. The knight takes him to Camelot Castle to meet King Arthur and Merlin. He falls in love at first sight with the king's niece, Alisande, but she is betrothed to Sir Lancelot. At the end, he saves her life, but is struck across the chest with an axe. When he wakes up, he is back in Connecticut in 1912. Soon after, when visiting a castle in England, he meets a girl called Sandy, who looks just like Alisande!

Genre: Psychological – Head Injury.

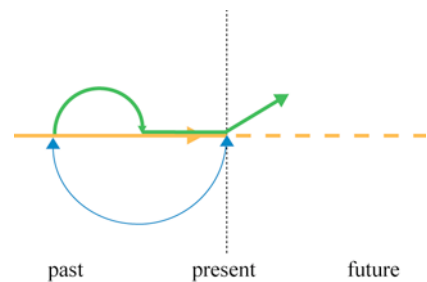
My Comments: Adapted from an 1889 Mark Twain novel of the same title.

Time Travel Summary: Hank changed the course of history while he was in the past, but on his return, the world around him appeared unchanged, so the timeline must have converged back. Soon after returning, when he meets Sandy, he acts differently to how he would have, if he had never met Alisande, so we can say his future is changing as a result of his trip and is therefore open. However, it is unclear whether the timeline will continue to diverge in the future, or whether it will converge back again.

Model of Time:

Open past, open future

Converging timeline



Contact (1997)

Director: Robert Zemeckis.

019

Writing Credits: Carl Sagan.

Production Companies: Warner Bros. Pictures, South Side Amusement Company.

Distribution: Warner Bros. Pictures.

Actors: Jodie Foster (Eleanor Arroway), Matthew McConaughey (Palmer Joss),
Angela Bassett (Rachel Constantine), Rob Lowe (Richard Rank).

Runtime: 153 minutes.

The Internet Movie Database User Rating: 7.3/10 61,229 votes

Overview: NASA launches a pod with a female scientist aboard. It returns within a split second, but she experienced 18 hours on another planet and her video recorder's time-code verifies this.

Plot Synopsis: Ellie, a female radio astronomer, detects a message from aliens in outer space. It turns out to be detailed instructions on how to build a pod to transport a human to their planet, Vega, which is 26 light-years away. When Ellie is chosen to pilot it, her boyfriend is reluctant for her to go because due to time dilation, she may not return until many years later, even though the trip only took her a few hours. NASA builds the pod and launches it with her aboard. It returns within a split second, seeming to have gone nowhere. However, she had actually passed through a wormhole in space-time, causing her to arrive at Vega within minutes, where she then spent 18 hours, which she diligently videorecorded. No one believes her; they all think she is deluded. Her only proof is her camera, but it only recorded static. However, on closer inspection, the time code shows that there was exactly 18 hours of static!

Genre: Science Fiction - Creating Wormholes.

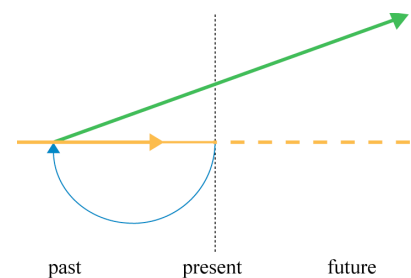
My Comments: This film is based on scientist Carl Sagan's novel of the same title. The theory of relativity and wormholes could have been discussed to explain how Ellie had travelled across the universe and back within a split second: the wormhole on the return journey must have been set up as a time machine, so that she travelled back in time to arrive back at the moment she left. Many viewers did not understand this and so believed that the whole episode was a hoax. It seems that the style of this movie was to get people asking questions, more than to give them the answers, both with the science and with the religion.

Time Travel Summary: Ellie had aged 18 hours more than people on Earth, so she must have moved backwards through time relative to them. The time travel begins when she leaves Vega. During her journey home, she travels about 18 hours backwards into her past, so that she arrives home just after she left. From this point on, she is on a diverging timeline, creating a new past and future.

Model of Time:

Open past, open future

Diverging timeline



Daleks' Invasion Earth: 2150 A.D. (1966)

Director: Gordon Flemyng.

020

Writing Credits: Terry Nation (BBC television series), Milton Subotsky (screenplay).

Production Companies: AARU Productions, British Lion Film Corporation.

Distributor: Amicus Productions (UK theatrical).

Actors: Peter Cushing (Doctor Who), Bernard Cribbins (Tom Campbell), Roberta Tovey (Susan), Jill Curzon (Louise).

Runtime: 81 minutes.

The Internet Movie Database User Rating: 5.8/10 16,395 votes

Overview: Doctor Who, his niece and granddaughter travel from the sixties to 2150 AD with a policeman in TARDIS, a time machine in the form of a phone box. After defeating the daleks, the return to a time just before they left.

Plot Synopsis: Late one evening in the mid-sixties, TARDIS is sitting on the pavement of a quiet London street. From the outside, it looks like a London police phone box from the 1950s, but on the inside it is a gigantic time machine. Doctor Who is inside with his niece, Louise, and his granddaughter, Susan. They are about to leave for the year 2150, when a local policeman, Tom, opens the door and collapses on the floor. He has been hit over the head, while trying to prevent a burglary of a jewellery shop on this street. They have no choice but to take him with them. He eventually recovers to find himself with three strangers in a future where the Daleks have destroyed most of London and are using the humans who survived as slaves in their mines. With the help of the others, the Doctor prevents the Daleks from carrying out their plan and then takes Tom back to his time. Tom asks to be returned just before the robbery, so he is able to change history by apprehending the thieves. We see him capture them and as he is driving them away, he is dreaming of becoming a detective inspector.

Genre: Science Fiction – Time Travel Vehicle.

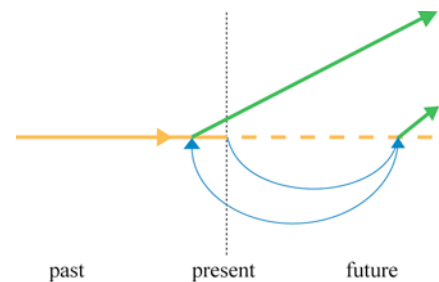
My Comments: The Doctor says that his time and space machine, TARDIS (Time And Relative Dimension(s) In Space), is “capable of taking us to any age on any planet in any universe.” When asked why the internal space of TARDIS is much greater than the space it occupies externally, the Doctor responds, “Just as time is regarded as the fourth dimension, so space is equally regarded as the fifth dimension. So space knows no boundaries and is completely timeless.” At the end of the film, the past is changed. We do not know what effect this will have on the future. If the timeline continues to diverge, then the battle with the daleks in 2150 A.D. may never take place. For this to happen, the timeline would have to converge, however, there is no evidence or mention of converging timelines in this film. There is a mention of his previous adventures in *Doctor Who and the Daleks* (1965) when he on arriving in London, he asks why the daleks are there, as he thought he had destroyed them. Then he questions whether that battle had taken place before or after 2150 A.D., as it had not taken place on Earth.

Time Travel Summary: Their first trip takes them to a future where they significantly change events - therefore the future is open. Their return trip allows Tom to change the past, which shows that it is also open. In both cases the timeline diverges away from the original.

Model of Time:

Open past, open future

Diverging timeline



***Déjà Vu* (2006)**

Director: Tony Scott.

021

Writing Credits: Bill Marsilli, Terry Rossio.

Production Companies: Touchstone Pictures, Jerry Bruckheimer Films, Scott Free Productions.

Distribution: The Walt Disney Company.

Actors: Denzel Washington (Agent Doug Carlin), Paula Patton (Claire Kuchever), Val Kilmer (Agent Paul Pryzwarra), James Caviezel (Carroll Oerstadt), Adam Goldberg (Dr. Alexander Denny), Elden Henson (Gunnars), Erika Alexander (Shanti).

Runtime: 126 minutes.

The Internet Movie Database User Rating: 7.1/10 47,761 votes

Overview: An FBI surveillance team can track the past using a new space-folding technology, which has a variable viewing window, but a fixed time lag of four days and six hours behind the present moment.

Plot Synopsis: A ferry is blown up in New Orleans harbour during a Mardi Gras party. Agent Doug Carlin is invited to join a newly formed FBI surveillance team to investigate the explosion. They can track the past using new 'space-folding' technology. It has a variable viewing window with a fixed time lag of four days and six hours behind the present moment. It can zoom down into a city through rooftops and walls to view and hear a conversation inside a room. They can record this and watch it again later, but cannot retrospectively change their chosen viewing angle. Doug uses the machine to send a note on a piece of paper back in time to warn himself about the terrorist. It arrives on his work desk, but his partner picks it up and goes to investigate. They follow him using the satellite technology and see him killed by the terrorist, Oerstadt. This creates one of the many paradoxes in this film, as Doug is now responsible for the death of his partner. Back in the present, the FBI arrest and charge Oerstadt, who says, "Anyone, who tries to stop [the explosion] from happening, causes it to happen!" Doug is put in the machine, like the piece of paper, and goes back in time to stop Oerstadt from blowing up the ferry. He dies doing so, but the other version of him is still alive and goes on to investigate the incident.

Genre: Science Fiction - Creating Wormholes & Transporting Body Through Time.

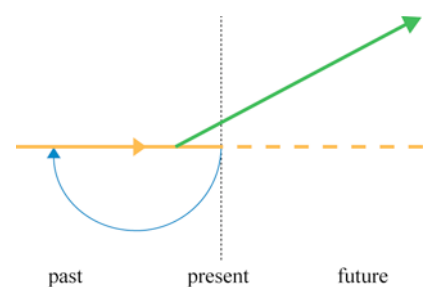
My Comments: This movie was written as a science fiction story, but director, Tony Scott, wanted to make it science fact, so he used Professor Brian Greene from Columbia University as his technical advisor. By surrounding the time machine with so much real technology, he added a layer of authenticity to it. Doug is told that the FBI team can fold space, bringing the target closer to them and then create a type of wormhole, called an Einstein-Rosen bridge, which is suspended via a gravitational field and powered by a huge particle accelerator. A folded piece of paper is used to explain folding space in a higher dimension so that an instantaneous link is created between two distant points. This way of explaining a wormhole was previously used in *Event Horizon* (1997).

Time Travel Summary: When Doug goes back in time, he is able to change the past, so the past is clearly open. However, the more he changes events on the timeline, the more he realises that the timeline is converging back and that he is not going to stop the disaster. He notices that the changes he makes are creating events that he had witnessed in the past before he made his trip. These causal loops are an example of the predestination paradox. However, he keeps trying and does eventually prevent the disaster by killing the terrorist and in the process gets himself killed, which causes the timeline to diverge off towards a new future. The causal loops in this film would lead us to believe that a model of time with a fixed timeline is being used. However, as Doug is able to finally cause the timeline to diverge, the only explanation left is that a double-well timeline is being used and that both the past and future are open.

Model of Time:

Open past, open future

Double-well timeline with causal loops



Demolition Man (1993)

Director: Marco Brambilla.

022

Writing Credits: Peter M. Lenkov, Robert Reneau.

Production Companies: Warner Bros. Pictures, Silver Pictures.

Distribution: Warner Bros. Pictures.

Actors: Sylvester Stallone (John Spartan), Wesley Snipes (Simon Phoenix), Sandra Bullock (Lt. Lenina Huxley).

Runtime: 115 minutes.

The Internet Movie Database User Rating: 6.2/10 38,522 votes

Overview: Criminals are cryogenically frozen once incarcerated. Their minds are then subconsciously programmed to remove their criminal tendencies. One man however is programmed to kill and then unfrozen and released into a crime-free society.

Plot Synopsis: Unorthodox police detective, John Spartan, is sentenced to 70 years sub-zero rehabilitation in the California Cryo-penitentiary for a crime he did not commit: the manslaughter of 30 innocent people. He is placed in a container of liquid, which is suddenly freezes all around him. All prisoners remain in cryo-stasis for the duration of their sentence, during which time their behaviour is altered by synaptic suggestion. The rehabilitation program uses a computer to draw up a skill and trade that best suits their genetic disposition. It implants the knowledge and the desire to carry out whatever training was assigned. In 2032, Simon Phoenix escapes from jail, killing the guards in the process, which is the first unlawful death that has taken place in this society in the last 22 years. Doctor Cocteau programmed Simon differently: he is now three times stronger, he can access all computers, drive all vehicles and knows the location of everything in town. Simon's skills were given to him for a reason: his job is to kill the leader of The Scraps, a group of revolutionaries who live underground in the city's sewers. His job becomes harder because the Police unfreeze John Spartan and offer him a pardon and a full reinstatement into the Police Force if he can catch Simon again. Simon gets five of his associates unfrozen to help him do his job. Dr Cocteau assures Simon that if he does his job, John will be put back in the freezer. After a battle, John freezes Simon and then shatters his frozen body, so that he can never come back.

Genre: Science Fiction - Cryogenic Freezing.

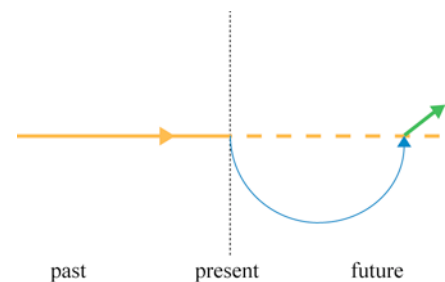
My Comments: Rather than using cryogenic freezing as a one-off device for taking a trip to the future, the whole plot of this film revolves around cryogenic freezing, which takes place at several times during the film. During rehabilitation, the prisoners are not supposed to be conscious, as they would go insane. However, John says he had a 36-year nightmare about people trapped in a burning building. Dr Cocteau dismisses this as an unfortunate side effect. See other films with cryogenic freezing such as: *Forever Young* (1992), *Idiocracy* (2006), *Sleeper* (1973), *Vanilla Sky* (2001) and *Austin Powers: International Man of Mystery* (1997).

Time Travel Summary: Cryogenic freezing does not allow the past to be changed, but the time travellers' arrival in the future causes the future to be changed. Also, from the moment they leave the timeline, their absence will cause a new timeline to be created, but we cannot say if this has converged or diverged unless we have backwards time travel.

Model of Time:

Undefined past, open future

Future timeline



***The Devil's Arithmetic* (1999)**

Director: Donna Deitch.

023

Writing Credits: Jane Yolen (novel), Robert J. Avrech (teleplay).

Production Companies: Lietuvos Kinostudija, Millbrook Farm Productions, Punch Productions, Showtime Networks.

Distribution: Showtime Networks.

Actors: Kirsten Dunst (Hannah Stern), Brittany Murphy (Rivkah), Paul Freeman (Rabbi), Mimi Rogers (Leonore Stern).

Runtime: 95 minutes.

The Internet Movie Database User Rating: 6.1/10 1,281 votes

Overview: When a teenage girl goes to open a door, there is a flash of bright light and she suddenly finds herself back in Poland in 1941 during the German occupation. Her aunt and cousin are caring for her.

Plot Synopsis: Teenager, Hannah, is reminded that she is named after her Aunt Eva's cousin and that she looks more like her every day. At a Jewish ceremony, when she opens a door, there is a flash of bright light and then she finds herself in a house in Poland during the German occupation in 1941. She is with her aunt, Nina and her cousin, Rivka, who are caring for her. This is her first day out of bed, and they are not surprised that she remembers nothing, as she had been very sick with a burning fever for two weeks. Soon after, they are at a wedding when Germans arrive and transport them all to a camp. Hannah cannot decide if it better to know, or not to know what is about to happen. She wishes she had paid more attention to her school classes about this period and to her Aunt Eva, who often told her about how she had survived one of these camps during the war. At the camp, she swaps places with Rivka when the Germans are about to take her to the gas chambers. As Hannah dies, it fades to black and she wakes up back in present day New York in her sick bed surrounded by her relatives, who are glad that she has regained consciousness. Hannah realises that her Aunt Eva changed her name and that she was actually called Rivka as a girl. She is only alive today because Hannah gave her life to save her, thus creating a causal loop. She is so pleased to be back with her family and now has a completely different attitude and understanding of what it means to be a Jew.

Genre: Fantasy – Portals.

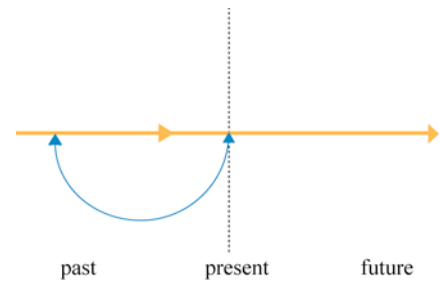
My Comments: If Hannah had not gone back to save Eva (aka Aunt Rivka), would someone else have saved her? I feel this is unlikely, as she was about to go off to the gas chambers. Therefore, Hannah had to go back in time to save her aunt's life, so the timeline could remain self-consistent.

Time Travel Summary: The predestination paradox means that Hannah had to go back, there is no free will or choice here, so both the past and future must be closed. The timeline is therefore fixed with a causal loop.

Model of Time:

Closed past, closed future

Fixed timeline with a causal loop



Doctor Who (1996)

aka *'Doctor Who: The Movie'*

Director: Geoffrey Sax.

024

Writing Credits: Matthew Jacobs.

Production Companies: Universal TV, BBC Worldwide, 20th Century Fox Television.

Distributor: Fox Network (USA TV), British Broadcasting Corporation (UK TV).

Actors: Paul McGann (8th Doctor Who), Eric Roberts (The Master / Bruce), Daphne Ashbrook (Dr. Grace Holloway), Sylvester McCoy (7th Doctor Who).

Runtime: 89 minutes.

The Internet Movie Database User Rating: 5.1/10

2,273 votes

Overview: The Doctor's nemesis, The Master, is about to take over the Doctor's body and destroy the Earth. Using his TARDIS, the Doctor has to go back in time several days to kill the Master and save the Earth.

Plot Synopsis: The Doctor is transferring the remains of his nemesis, The Master, back to his home planet of Gallifrey. He is able to come back to life though, in the form of slime and causes the TARDIS to land in San Francisco in 1999. As soon as The Doctor exits the TARDIS, he is shot and rushed to hospital for an emergency operation. Grace, a female surgeon, accidentally causes his death, so he regenerates to become the eighth Doctor Who and asks Grace to help him. The Master takes over a man's body and with the help of Chang Lee, a misguided youth, plots to take over The Doctor's body. The final showdown takes place inside the TARDIS just before midnight on New Year's Eve, as the Earth is about to be destroyed by the Master. The Master kills Chang Lee and starts to transfer the Doctor's unused lives to himself. Grace runs to the control panel and diverts the energy of the TARDIS causing it to go into a temporal orbit. When Grace returns, she is freeing The Doctor from his chains, but The Master kills her. The Doctor kills The Master in a fight. Time then runs backwards, so Chang Lee and Grace come back to life. The Doctor resets the controls of the TARDIS, so that it travels forwards to midnight on New Year's Eve. Grace and Chang Lee leave to continue their lives on Earth, while The Doctor takes off for another adventure in his TARDIS.

Genre: Science Fiction – Time Travel Vehicle.

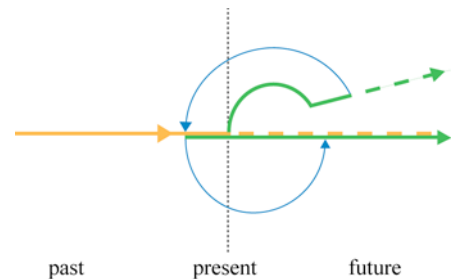
My Comments: The Doctor tells Gareth to answer the second question on his mid-term exam. He tells Grace that Gareth is destined to save the human race several times. When she asks about her future, he says, “The Universe hangs by such a delicate thread of coincidences, it is useless to meddle with it unless, like me, you are a Time Lord.” When the TARDIS went back in time, if Grace and Chang Lee came back to life, why did not The Master? This was not explained. When the Doctor asks Grace and Chang Lee if they would like him to return them to 29th December, they say that they would not want to live through that again, so he drops them off at midnight on New Year’s Eve. As The Master is dead, they would have been dropped off on the original timeline, so I do not understand why they would they have had to live through all that again. Another point, if the TARDIS had returned any earlier than at the exact time it left, then they may have met another version of themselves.

Time Travel Summary: The Doctor’s comment about a “delicate thread” implies a double-well timeline. He was confident of not changing the timeline himself, but did not want to give away too much about the future in case it caused the timeline to diverge away. In the diagram below, the present moment is when the Doctor arrives, which causes a small divergence. When the Doctor realises that The Master is going to stop the timeline from converging again by destroying the Earth at midnight, the Doctor goes back to a point in time before they arrived, which allows the original timeline to be restored. The TARDIS then travels forward again and lands on Earth just after midnight, where they find the Earth intact, which means the timeline was indeed successfully restored.

Model of Time:

Open past, open future

Double-well timeline



Donnie Darko (2001)

Director: Richard Kelly.

025

Writing Credits: Richard Kelly.

Production Company: Pandora Cinema, Flower Films (II), Adam Fields Productions, Gaylord Films, Newmarket Films.

Distributor: Pandora Cinema.

Actors: Jake Gyllenhaal (Donnie Darko), Jena Malone (Gretchen Ross), Holmes Osborne (Eddie Darko), Mary McDonnell (Rose Darko), Maggie Gyllenhaal (Elizabeth Darko), Daveigh Chase (Samantha Darko), Drew Barrymore (Karen Pomeroy), Katharine Ross (Dr Lilian Thurman), Patrick Swayze (Jim Cunningham), James Duval (Frank), Beth Grant (Kitty Farmer).

Runtime: 133 minutes (director's cut).

The Internet Movie Database User Rating: 8.3/10 159,893 votes

Overview: A jet engine falls off a plane and passes through a time portal to 28 days earlier, which causes an unstable tangential universe to break away. Before the universe collapses upon itself, Donnie has to realign it by turning back time to before the event.

Plot Synopsis: Donnie is sleepwalking when he meets a ghost called Frank, who is dressed in a Halloween bunny costume. He tells Donnie that the world will end in 28 days. Meanwhile, a jet engine falls off a plane and passes through a portal in the sky causing it to travel backwards in time 28 days to the present. It crashes through the roof of Donnie's house landing on the bed where he would have been sleeping. This artefact causes a tangent universe to split away from the primary universe. Frank continues to haunt Donnie, urging him to save the world. Donnie asks his science teacher for advice about wormholes and is given a book to read, called *The Philosophy of Time Travel*, which helps him to understand what is going on. After several ugly incidents and a couple of deaths, Donnie is able to reverse time until he is again lying in his bed at the start of the film. This time, he is laughing, either because he believes it was all a bad dream, or because he knows that he was meant to die this way. The jet engine lands on him, and he dies a hero because if he had allowed the tangent universe to collapse, it would have taken the primary universe with it.

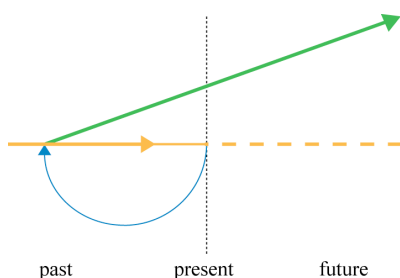
Genre: Science Fiction - Finding Portals and Time Reversal.

My Comments: As Donnie is on medication, we might ask ourselves about his sanity, as the story is told from his perspective, but on the soundtrack of the Director's Cut version the film, director Richard Kelly says, "There is no insanity, this is a science fiction story for me." When asked about where the jet engine comes from after the tangent universe has been collapsed, Kelly says, "Any time you do a time travel movie, you are going to have a paradox of some sort: something that can never fully make logical sense how it could occur." Finding the logic in this movie has been very challenging!

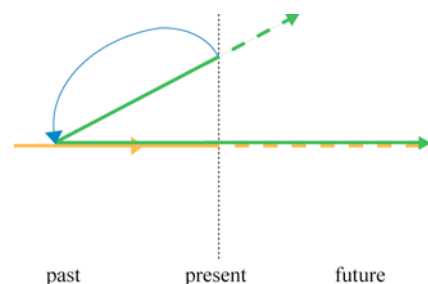
Time Travel Summary: When Donnie arrived in his past, he made a different choice, which created a different future for everyone and hence a different timeline. My interpretation was that he restored the original timeline. Roberta Sparrow's book explains that the tangent universe is highly unstable, so eventually it will collapse upon itself, causing a black hole to be formed within the primary universe that is capable of destroying all existence. The tangent timeline is certainly an alternate timeline, but there is no evidence in the film to suggest that it could have existed in parallel to the primary. It is more likely that the primary timeline collapsed and was replaced from that point on by the tangent timeline. Donnie then travelled back to the point of divergence and restored the original timeline by taking himself out of the equation, which was probably his original destiny. The model of time used in this film has an open past, open future with a diverging timeline.

Model of Time: Open past, open future with a diverging timeline.

The jet engine falls through a portal and arrives 28 days earlier, which creates a tangent universe:



Donnie travels back in time and his death allows the original timeline to be restored:



Dr Plonk (2007)

Director: Rolf de Heer.

026

Writing Credits: Rolf de Heer.

Production Companies: Australian Film Finance Corporation, Vertigo Productions.

Distribution: Fandango.

Actors: Nigel Lunghi (Dr Plonk), Paul Blackwell (Paulus), Magda Szubanski. (Mrs Plonk)

Runtime: 85 minutes.

The Internet Movie Database User Rating: 6.8/10 162 votes

Overview: Dr Plonk builds a time machine so that he can make a return trip 100 years into the future to the year 2007 to collect evidence that the world will end one year after that.

Plot Synopsis: The esteemed scientist, Dr Plonk, calculates that the world will end in 101 years. He needs evidence to prove this, so he builds a time machine to transport someone forwards 100 years. The person will get into a special coffin-like box that the time machine will transport through time. He hopes evidence of this impending disaster will be found and that it will convince the Prime Minister of the day to take action to stop this outcome. Plonk, his wife and his manservant Paulus all take separate return trips to the year 2007, however, none of them find any evidence to take back with them. He decides to take the Prime Minister with him on his last trip to show him the evidence. Unfortunately the time machine is destroyed in an explosion and they become stranded in 2007. Plonk is branded a dangerous terrorist and is sentenced to life imprisonment. The prime minister is sent to an asylum, as no one believes who he really is. However, his wife transported the box back just after the explosion, meaning that it arrived in burnt pieces. She starts to glue the box back together, but seems to be having too much fun with Paulus to worry about finishing it.

Genre: Science Fiction - Transporting Body Through Time.

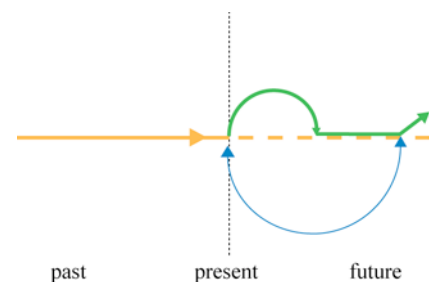
My Comments: The doctor observes that the future does not change as a result of all the comings and goings, so we have to assume the timeline is converging. The present moment is taken as 1907, as this is when the first time travel took place.

Time Travel Summary: As this time machine only goes to the future and back to the present, we cannot say whether the past is open or closed. Dr Plonk arrives in 2007 and then travels back through time with information about this future. Although he tries hard to change the timeline, he is unable to do so because each time he returns to 2007, nothing has changed. This infers an open future with a converging timeline. He becomes stuck in the future, which creates a different future for Paulus and Mrs Plonk. Although this means the timeline will diverge at this point, it must converge before he arrives in 2007. The future will diverge from 2007 onwards due to their presence. It will probably converge back soon after, as that would be consistent with this model of time.

Model of Time:

Undefined past, open future

Converging timeline



Durango Kids (1999)

Director: Ashton Root.

027

Writing Credits: William Martin Bremmen, Ashton Root.

Production Companies: Good Friends Productions.

Distribution: Lions Gate Films Home Entertainment.

Actors: Larry Drake (Dudley), Curtis Williams (Cameron), Brendon Ryan Barrett (Taylor), Caitlin Barrett (Katie), Taylor Root (Spencer Grey).

Runtime: 102 minutes.

The Internet Movie Database User Rating: 4.7/10 162 votes

Overview: Four children discover that a mineshaft is actually a time travel portal that allows them to travel back and forwards between their time and the same location in the times of the Wild West.

Plot Synopsis: Four children go into a mine looking for lost gold and find that the mineshaft is a time travel portal that brings them out at the same location, but in the Old West. They can move freely between the worlds by climbing up and down the shaft. Soon, they find that their school principal has been moving between these worlds for a while and has become the town sheriff in the Wild West. He is about to collude with three bandits who are in town to rob the bank. With the help of the elder brother of one of the boys, they try to stop him from changing history.

Genre: Fantasy – Portals.

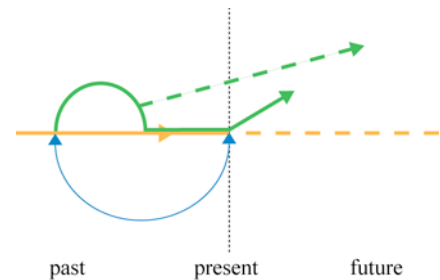
My Comments: As the children go back and forth, they are able to change the past, but this has little effect on the present that they return to. Therefore this would indicate that the timeline converges each time they change the past. It is the type of timeline that the characters believe is in place that needs to be identified.

Time Travel Summary: The children are afraid that their school principal is about to make a significant change to history, which will make a difference to the present when they return (as represented by the dashed line on the diagram below). This shows that they believe in a model of time with a double-well timeline, even though the timeline eventually converges back to the original one. They use the information that they bring from the past to their present to change the future, which means that it is open.

Model of Time:

Open past, open future

Double-well timeline



Evil Dead 2 (1987)

aka '*Evil Dead 2: Dead by Dawn*'

Director: Sam Raimi.

028

Writing Credits: Sam Raimi, Scott Spiegel.

Production Companies: De Laurentiis Entertainment Group (DEG), Renaissance Pictures.

Distribution: Rosebud Communications Releasing.

Actors: Bruce Campbell (Ashley 'Ash' J. Williams), Sarah Berry (Annie Knowby), Dan Hicks (Jake).

Runtime: 85 minutes.

The Internet Movie Database User Rating: 7.9/10

35,979 votes

Overview: Ash and his car are sucked into a vortex and travel through time and space to England during the Middle Ages. He soon realises that he was the prophetic saviour mentioned in *The Book of the Dead* that falls from the sky.

Plot Synopsis: This film has a very similar opening to *Evil Dead* (1981), the first film of the trilogy. Ash Williams and his girlfriend go on a romantic break to the woods. In an old cabin, Ash finds a tape. When he plays it, he hears a professor say that during an archaeological dig, he discovered *Necronomicon Ex-Mortis* (The Book of the Dead) and he goes on to read out passages from it. This releases an evil force, which Ash spends the rest of the film fighting. Towards the end of the story, he and his car are sucked into a vortex and travel through time and space before falling from the sky in medieval times. He looks up to see that a group of knights are surrounding him. They decide to kill him, but a large Deadite bird attacks from above, causing them to run. Ash blows its head off with his rifle, which shocks the knights. One removes his mask and says, "Hail he, who hath fallen from the sky to deliver us from the terror of the Deadites!" Ash realises that he has become the prophetic saviour mentioned in the book of the dead that falls from the sky to command this army of knights.

Genre: Fantasy – Portals.

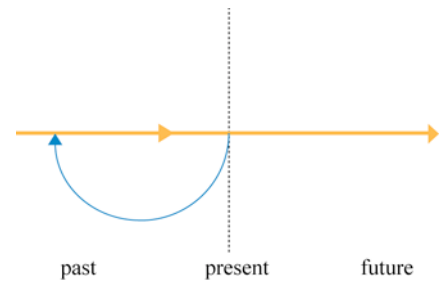
My Comments: The third of the Evil Dead trilogy. The first had no time travel, the second finished with time travel, which is where the third started. This film has another example of the predestination paradox, this time identified by a premonition in the book of the dead.

Time Travel Summary: Ash travels back in time against his will to find that this had to happen for him to reluctantly take his rightful place in history. This causal loop had to happen to keep the timeline self-consistent.

Model of Time:

Closed past, closed future

Fixed timeline with a causal loop



Family Guy Presents Stewie Griffin: The Untold Story (2005)

Director: Pete Michels, Peter Shin.

029

Writing Credits: Gary Janetti (part 1), Chris Sheridan (part 1), Alex Borstein (part 2), Steve Callaghan (part 3).

Production Companies: 20th Century Fox Television, Fox Television Animation, Fuzzy Door Productions, Sunwoo Entertainment, Twentieth Century-Fox Film Corporation.

Distribution: 20th Century Fox Home Entertainment.

Actors: Seth MacFarlane (Stewie Griffin/Peter Griffin/Brian Griffin/Glen Quagmire/Tom Tucker/Stuart 'Stu' Griffin), Alex Borstein (Lois Griffin/Tricia Takanawa/Vanessa/Condoleezza Rice), Seth Green (Chris Griffin).

Runtime: 88 minutes.

The Internet Movie Database User Rating: 7.8/10 17,493 votes

Overview: A boy discovers that he will never fulfil his life dreams due to a near-death experience that will cause him to take fewer risks in his life. He uses a wristwatch time machine to go and prevent this from happening.

Plot Synopsis: 50 minutes into the movie, young Stewie Griffin meets someone who he thinks is his real father, due to their uncanny likeness. This man admits that he is really an older version of Stewie from the future, called Stu. He says he is not allowed to speak to his younger self, as it is a “violation of the terms of his vacation”. He tries to return to his own time by clicking a button on his wristwatch, however, Stewie grabs hold of Stu’s arm just in time and they get transported to the future together. Stewie soon realises that none of his dreams have come true. He eventually works out that it he has taken fewer risks in his life because of a near-death experience at his local swimming pool, when he collapsed a tower, which only just missed him. Stewie asks Stu to get him a time travel watch, so he can go back in time to prevent his near-death experience. Stu realises that if Stewie is successful, their timeline will change and he will become a really different person. Stewie goes back and stops himself from blowing up the tower. They talk for a while before the original Stewie shoots Stu with a vaporizing gun, which causes him to disappear.

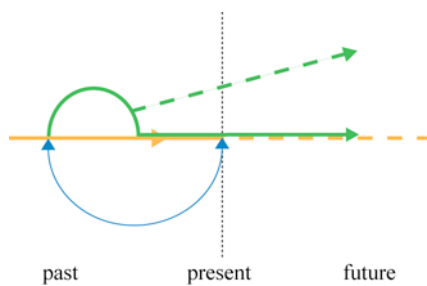
Genre: Science Fiction - Transporting Body Through Time.

My Comments: We can assume that the purpose of Stu not violating the terms of his vacation is to stop him from making a significant enough change in the past, which might affect the time he has come from.

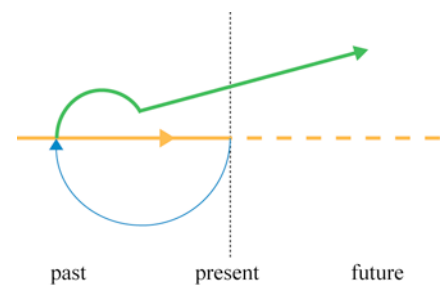
Time Travel Summary: This film is using a model of time with a double-well timeline. Stu makes two trips back in time: The first one is when he meets his younger self, Stewie. They return together to his unchanged present. This means that any divergence he caused in the timeline must have re-converged (see first figure). They then travel back together and Stewie makes a significant change to the past, which he hopes will cause a new better future for him. Stu is then shot dead, so his journey ends at the point of divergence, but Stewie continues along this new timeline.

Model of Time: Open past, open future with a double-well timeline.

Stu's first trip:



Stu's second trip:



The Family Man (2000)

Director: Brett Ratner.

030

Writing Credits: David Diamond, David Weissman.

Production Companies: Beacon Communications, Howard Rosenman Productions, Riche-Ludwig Productions, Saturn Films.

Distribution: Universal Pictures.

Actors: Nicolas Cage (Jack Campbell), Téa Leoni (Kate Reynolds), Don Cheadle (Cash).

Runtime: 125 minutes.

The Internet Movie Database User Rating: 6.6/10 26,270 votes

Overview: A man wakes up to find he is living a parallel life, where instead of having left his college sweetheart, Kate, to pursue his career in Europe, he had stayed to settle down with her and have kids.

Plot Synopsis: Jack is a single, successful businessman. He tells Cash that he has everything he wants and that there is nothing missing in his life. As Cash watches Jack drive off in his Ferrari, Cash laughs and says, “You asked for it!” Jack wakes up the next day to find he is living a parallel life, where instead of having left his college sweetheart, Kate, to pursue his career in Europe, he had stayed to settle down with her and have kids. His experience of this alternate history is only temporary and he returns to his own timeline, but not before he has become attached to his family life. On returning to his bachelor life of financial success and loneliness, he seeks out Kate, who is also unmarried and financially successful. He tells her about his experience in their parallel life, and tries to see if they can rekindle their relationship.

Genre: Psychological – Angels.

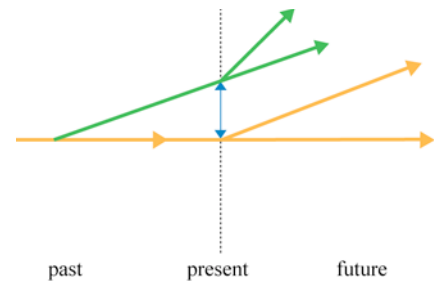
My Comments: This film does not explain how the alternate world is created and accessed; we are left to assume that Cash is some kind of angel like Clarence in the film, *It's a Wonderful Life* (1946). Two parallel pasts are compared and then Jack makes a decision, which changes his future. So this timeline then splits into two and these two futures co-exist in parallel alongside the alternate reality from which he has just returned. This film uses a similar concept to *Me Myself I* (1999).

Time Travel Summary: We can see that more than one parallel past exists, but as Jack does not travel back in time in either timeline, the past of both timelines is undefined. On returning from the alternate timeline because he is armed with knowledge gained from that timeline, he makes changes to his present, which creates a different future. It also creates a different future for the timeline he left, as he has left his mark there. The original futures are not lost; they remain in parallel to the new ones.

Model of Time:

Undefined past, open future

Parallel timeline



The Final Countdown (1980)

Director: Don Taylor.

031

Writing Credits: Thomas Hunter, Peter Powell.

Production Companies: Bryna Productions, Polyc International BV.

Distribution: United Artists.

Actors: Kirk Douglas (Capt. Matthew Yelland), Martin Sheen (Warren Lasky), Katharine Ross (Laurel Scott).

Runtime: 103 minutes.

The Internet Movie Database User Rating: 6.6/10 5,230 votes

Overview: During a bizarre electromagnetic storm, a ring of energy passes around a U.S. naval battleship. It seems they passed through a time portal to WWII when the Japanese are about to attack Pearl Harbour.

Plot Synopsis: The aircraft carrier, USS Nimitz, is undergoing routine operations in the North Pacific in 1980 when it encounters a bizarre electromagnetic storm. Just as a jet fighter is coming in to land on the ship, a ring of energy passes around them both. After the storm has passed, they soon realised that they have just passed through a time portal and they are at the same location, but in December 1941, just before the Japanese attacked Port Pearl Harbour. They have enough firepower to take out the whole Japanese fleet, but should they interfere with history or not? As they have already saved Senator Chapman from his death, they realise they have already changed history, so they send fighter planes to stop the fleet. However, before they reach their target, the planes are recalled to the ship, as a similar electromagnetic storm is brewing. They all pass back through the portal to 1980 – except for one officer who was stranded. He waits 40 years and then shows up at the dockside as an old man and greets the young crew of the USS Nimitz, as they return from their mission.

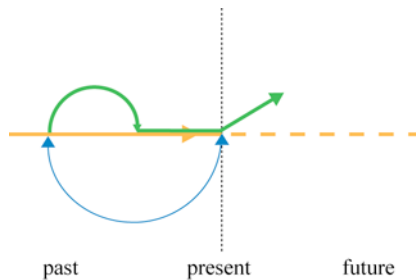
Genre: Science Fiction - Finding Portals.

My Comments: While in the past, the aircraft carrier could have changed a significant event, which would have changed history, but circumstances prevented it, which is typical of the Novikov self-consistency conjecture and a converging timeline.

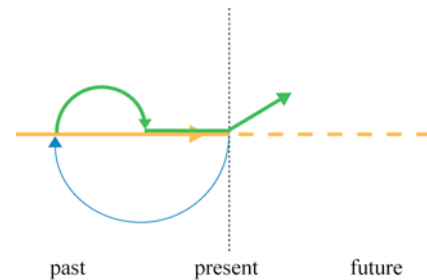
Time Travel Summary: The fact the crew saved a life and left a sailor behind when they were in the past shows that the past is open. However, the timeline has converged by the time they return to their present because they find that history has not been changed by their adventure into the past. The crew returned without one of their officers, but then met him as an old man when they later reached port. So the future must also be open, as they were experiencing a different future than the one they would have had if they had not time travelled. Although the lost officer only had a one-way trip, he would have been on the same timeline as the crew.

Model of Time: Open past, open future with a converging timeline.

Crew's trip:



Lost sailor's trip:



Flight Of The Navigator (1986)

Director: Randal Kleiser.

032

Writing Credits: Mark H. Baker, Michael Burton.

Production Companies: New Star, PSO, Viking Films, Walt Disney Pictures.

Distributor: Buena Vista Pictures.

Actors: Joey Cramer (David Scott Freeman), Paul Reubens (Trimaxion), Veronica Cartwright (Helen Freeman), Cliff De Young (Bill Freeman), Sarah Jessica Parker (Carolyn McAdams).

Runtime: 90 minutes.

The Internet Movie Database User Rating: 6.6/10 7,148 votes

Overview: A boy who is abducted by aliens is returned eight years later, but has not aged a day. He learns to pilot a flying saucer and navigates it through space and backwards through time back to his family in his own time.

Plot Synopsis: Aliens abduct David, a 12-year-old boy, and fill his brain to overflowing with space charts during tests they performed on him. As it is too risky for him to be returned to 1978, the aliens return him to his family eight years later, but he has not aged a day. David becomes a freak show for scientists and he realises that they will never leave him alone if he stays. He asks the aliens to transport him back to his time telling them that he is willing to take the risk. During this process, he learns to navigate the flying saucer through space and time, hence the title of this film.

Genre: Science Fiction – Time Travel Vehicle.

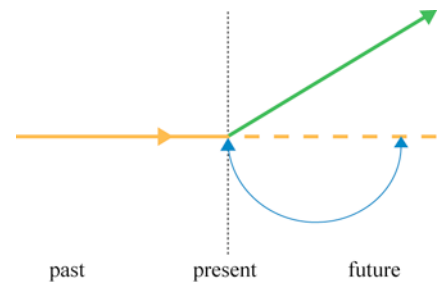
My Comments: David sees how his family’s life has progressed since his disappearance and knows that if he goes back to the moment he was abducted that will create a new timeline with him as part of the family. It is assumed that the original branch will collapse if this new one is created.

Time Travel Summary: When David goes back in time, a new timeline will replace the old, thus changing the past and creating a new future.

Model of Time:

Undefined past, open future

Diverging timeline



The Forbidden Kingdom (2008)

Director: Rob Minkoff.

033

Writing Credits: John Fusco.

Production Companies: Megalovision, Whaley-Malin Productions.

Distribution: Lionsgate.

Actors: Jet Li (The Monkey King/The Silent Monk), Jackie Chan (Lu Yan/Old Hop), Jason Tripitikas (Michael Angarano).

Runtime: 113 minutes.

The Internet Movie Database User Rating: 6.9/10 24,865 votes

Overview: An American teenager discovers the legendary stick weapon of the Chinese sage and warrior, the Monkey King and then unexpectedly finds himself time travelling back to ancient China.

Plot Synopsis: Jason, a Boston teenager, finds a golden staff in a pawnshop. The shop owner, Old Hop, is shot when a gang rob his store and he tells Jason that he must now return the staff to its rightful owner. Jason runs from the gang with the staff in his hand and as he falls off the roof of a building, he is transported back in time to ancient China, where his mission is to return the staff to the immortal Monkey King, who has been petrified. He meets Lu Yan, another immortal, who teaches him Kung Fu and helps him fight his way to Five Elements Mountain, where he frees the Monkey King. His reward is being returned to Boston in his own time. He then wakes up in the spot where he previously fell and it seems no time has passed. With his newfound Kung Fu skills, he is able to fight off the gang single-handedly and call the police. Old Hop survives the bullet wound and Jason realises that he is the immortal, Lu Yan.

Genre: Fantasy – Ancient Artefact.

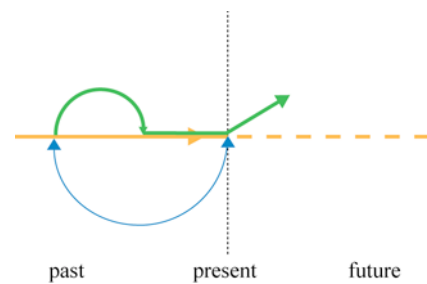
My Comments: The idea of immortals has not been discussed up to now. Is it a biological phenomenon that stops them from aging like the rest of humanity, or do they have a separate timeline to the rest of the world? Unfortunately, there is no scope to discuss this topic in this thesis.

Time Travel Summary: Jason is able to alter history, but on his return to the present, nothing has changed, so it appears the timeline has converged back to the original, which prevents a paradox. However from this point on, he is able to use his new abilities and knowledge to change the future.

Model of Time:

Open past, open future

Converging timeline



Forever Young (1992)

Director: Steve Miner.

034

Writing Credits: J. J. Abrams.

Production Companies: Icon Entertainment International, Warner Bros. Pictures.

Distribution: Warner Bros. Pictures.

Actors: Mel Gibson (Capt. Daniel McCormick), Jamie Lee Curtis (Claire Cooper),
Elijah Wood (Nat Cooper).

Runtime: 102 minutes.

The Internet Movie Database User Rating: 5.9/10 12,671 votes

Overview: A 1939 test pilot volunteers to be the first human to be cryogenically frozen in a new top-secret experiment, which will last one year. However, the scientist in charge dies and the capsule is not discovered until 1992.

Plot Synopsis: Daniel is a test pilot in 1939 and his lover has been in a coma for several months. He does not want to be around when she dies, so he volunteers to be the first man to be cryogenically frozen in a new top secret experiment, which will last one year. However, the scientist dies and the capsule is not discovered until 1992. He begins to age quicker than all those around him, as time seems to be catching up with him. He finds out that his lover survived the coma and is still alive. He eventually tracks her down and they are reunited.

Genre: Science Fiction - Cryogenic Freezing.

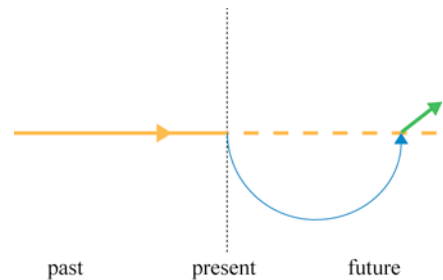
My Comments: A film with forward time travel, but no backwards time travel. See also other films with cryogenic freezing, such as *Idiocracy* (2006), *Demolition Man* (1996), *Sleeper* (1973) and *Austin Powers: International Man of Mystery* (1997).

Time Travel Summary: Cryogenic freezing does not allow the past to be changed, but the time traveller's arrival in the future allows the future to be changed. Also, from the moment he leaves the timeline, his absence will cause a new timeline to be created, but we cannot say if this has converged or diverged unless we have backwards time travel.

Model of Time:

Undefined past, open future

Future timeline



***Freejack* (1992)**

Director: Geoff Murphy.

035

Writing Credits: Robert Sheckley (novel), Steven Pressfield (screen story).

Production Companies: Morgan Creek Productions.

Distribution: Warner Bros. Pictures.

Actors: Emilio Estevez (Alex Furlong), Mick Jagger (Vacendak), Rene Russo (Julie Redlund), Anthony Hopkins (McCandless).

Runtime: 110 minutes.

The Internet Movie Database User Rating: 4.9/10 5,656 votes

Overview: Just before Alex dies in a car accident, his body is transported to the year 2009 to be used as a replacement for a rich dying man, who has paid for his body. He escapes and is now on the run as a 'Freejack'.

Plot Synopsis: McCandless is dying in 2009. The Spiritual Switchboard holds dead people for three days before they pass over to the other side, unless in the meantime they can find another body to inhabit. He orders bounty hunters to get the healthy body of Alex Furlong, a racing driver from the past (our time), who is about to die in a car accident. The team lock their co-ordinates onto Alex. Just as his car leaves the track, they transport his body and his car goes on to hit a bridge and then explodes. His body arrives in the future onto an ambulance bed. He wakes up and when they realise he is conscious, they try to apply a voltage to the frontal lobe, but armed soldiers attack the vehicle. Amongst the explosions, Alex escapes and is on the run as a 'Freejack' - someone who has escaped from the past and arrived in this future year. As they technically died in their own time, the person who paid for the transporting owns their bodies. Alex spends the rest of the movie on the run in the future world and never returns to his present.

Genre: Science Fiction - Transporting Body Through Time.

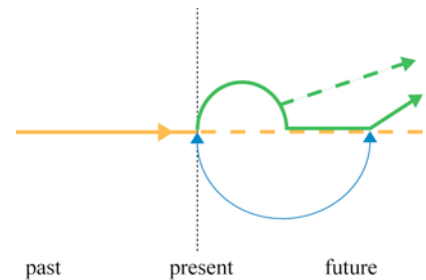
My Comments: Scientists from the future are able to change our present by teleporting a man to their time. However, they time it just before he dies, so that the timeline quickly converges. Although the future did not diverge, the scientists thought it would if they did not time the kidnap at just the moment before the body was about to die. The dashed line in the diagram below represents this potential diverging future.

Time Travel Summary: The past is undefined, as nobody travels back beyond the date that the first time travel to the future takes place. The scientists from the future believe that the timing of the kidnapping is critical, so they must be using a model of time with a double-well timeline. The transported body is used to prolong the life of someone about to die, which is further evidence that the future is open.

Model of Time:

Undefined past, open future

Double-well timeline



Frequency (2000)

Director: Gregory Hoblit.

036

Writing Credits: Toby Emmerich.

Production Companies: New Line Cinema.

Distribution: New Line Cinema.

Actors: Dennis Quaid (Frank Sullivan), James Caviezel (John Sullivan).

Runtime: 118 minutes.

The Internet Movie Database User Rating: 7.3/10 28,744 votes

Overview: A policeman finds that he is able to communicate with his father 30 years ago when he was still alive, by using his old ham radio. This temporary phenomenon is being caused by the rare Aurora Borealis in the sky above.

Plot Synopsis: A policeman finds that he is able to communicate with his father 30 years ago when he was still alive by using his old ham radio. This phenomenon will only be short-lived, as it is being caused by the rare Aurora Borealis in the sky above. Only information travels through time in this movie, but enough to make instantaneous radical changes to the present. He saves the life of his father, by warning him of a fatal accident, but by changing history, his mother ends up murdered. The father and son try to change history again by stopping the murder before they loose their radio connection.

Genre: Science Fiction - Finding Portals.

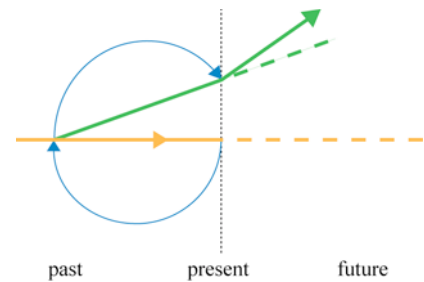
My Comments: Warning people in the past about what will happen can change history. For example, the father is inscribing a message on his desk with his hot soldering iron in the sixties. His son is now watching the message appear letter by letter, on the same desk that he is sitting at 30 years later. We also see that people are suddenly missing from family photos, as the past is changed as a consequence of their verbal communication across time.

Time Travel Summary: The radio communication has direct and immediate consequences that cause the timeline to instantaneously diverge. The future is also changed as a result of this communication, so both are open. When John sends a message back to Frank, Frank takes an action, which causes immediate consequences in the future. When Frank sends information to John in the present, he takes action and the timeline changes again.

Model of Time:

Open past, open future

Diverging timeline



Galaxy Quest (1999)

Director: Dean Parisot.

037

Writing Credits: David Howard.

Production Companies: DreamWorks SKG.

Distribution: DreamWorks Distribution.

Actors: Tim Allen (Jason Nesmith), Sigourney Weaver (Gwen DeMarco), Alan Rickman (Alexander Dane), Sam Rockwell (Guy Fleegman).

Runtime: 102 minutes.

The Internet Movie Database User Rating: 7.2/10 43,088 votes

Overview: Aliens mistake TV episodes from 18 years ago as historical documents and think that the actors were real space travel heroes. They have a device called the Omega 13, which can take them back through time 13 seconds.

Plot Synopsis: The actors from the in the sci-fi TV show, *Galaxy Quest*, are making appearances in costume at conventions, etc. The Thermians (aliens from *Klatu Nebula*) have mistaken their episodes of *Galaxy Quest* from 18 years ago as historical documents and thought that the actors were real space travel heroes. So they teleported them all to their space vessel in the 23rd quadrant of the Gamma segment to help them win a battle. The aliens have a device called the Omega 13, which when activated, takes them back through time 13 seconds, which comes in handy at the end,

Genre: Science Fiction - Hand-held Time Travel Device and Finding Portals.

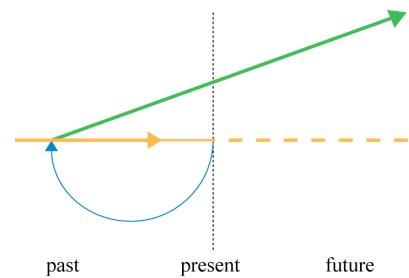
My Comments: The aliens called their transportation method teleportation, but it was not at all. They covered the people in goo and fired them like a bullet through a wormhole. On the way back, they called the wormhole a black hole, which is not the same at all.

Time Travel Summary: Using the Omega 13, the aliens are able to go back and change an event in the past, thus creating a different future.

Model of Time:

Open past, open future

Diverging timeline



The Girl Who Leapt Through Time (2006)

aka *'Toki o kakeru shôjo'*

Director: Mamoru Hosoda.

038

Writing Credits: Yasutaka Tsutsui (novel), Satoko Okudera (screenplay).

Production Companies: Mad House, Happinet Pictures, Kadokawa Pictures, Kadokawa Shoten Publishing Co., Memory Tech, Q-Tec, Toki wo Kakeru Shôjo Seisaku Inkai 2006.

Distribution: Kadokawa Herald Pictures.

Actors: Riisa Naka (Makoto Konno), Takuya Ishida (Chiaki Mamiya), Mitsutaka Itakura (Kôsuke Tsuda), Sachie Hara (Kazuko Yoshiyama).

Runtime: 98 minutes.

The Internet Movie Database User Rating: 8.1/10 3,433 votes

Overview: A teenage girl in Japan discovers how to leap back through time to change past events to try and create a better future. She discovers that one of her best friends is a time traveller who has come back from the future.

Plot Synopsis: Makoto is a teenager, who discovers she can leap back through time to change past events. She visits her aunt who tells her, “that was a time leap ... time is irreversible ... you ca not reverse the flow of time ... which means that you were the one who went back in time ... you travelled through time and returned to the past!” Makoto starts by using her newfound power to avoid being late for school and then goes on to use her leaps to avoid embarrassing social situations. She notices a tattoo of the number ten has appeared on her arm, which reduces by one each time she leaps through time. She then starts to use her leaps to help friends, until she runs out of leaps just as she needs one to prevent her close friend, Kôsuke, from being killed in an accident. Suddenly, time is frozen all around by another close friend, Chiaki, who tells her that he is actually a time traveller from the future, and that he has just used his last leap to save Kôsuke, which means that he is unable to return to his home. He disappears, but somehow leaves Makoto with one more time leap tattooed on her arm. She uses it to go back to when she first gained her powers. She finds Chiaki and warns him that he will run out of leaps if he does not return to his own time right away. She realises she is in love with him and before he leaves, he tells her that he will “wait for her in the future”.

Genre: Fantasy – Unexplained.

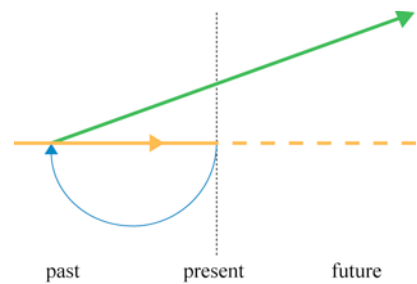
My Comments: This Japanese animated feature film is roughly a continuation of a novel of the same title by Yasutaka Tsutsui, which was set 20 years before the plot of the film. Note how Makoto uses time travel to go back in time to avoid being late for her class, just as Hermione did in *Harry Potter and the Prisoner of Azkaban* (2004). The meaning of the ending when Chiaki says that he will wait for Makoto in the future is ambiguous and open to interpretation.

Time Travel Summary: Every leap back in time causes a new diverging timeline to be created, which replaces the original one.

Model of Time:

Open past, open future

Diverging timeline



Groundhog Day (1993)

Director: Harold Ramis.

039

Writing Credits: Danny Rubin.

Production Companies: Columbia Pictures Corporation.

Distribution: Columbia Pictures.

Actors: Bill Murray (Phil Connors), Andie MacDowell (Rita).

Runtime: 101 minutes.

The Internet Movie Database User Rating: 8.1/10 102,272 votes

Overview: A TV weatherman wakes up to find that Groundhog Day is starting over again. He repeats this day many times, until he finally escaped the time loop when he wakes up the day after Groundhog Day.

Plot Synopsis: Weatherman, Phil is filming a report on location and wakes up the following morning in his Bed and Breakfast room to find that exactly the same day is starting all over again. This then continues to happen day after day. Each time the day is repeated, he gains cumulative memories, so that he can learn by his mistakes and watch his days get better each time. At one point, he realises that he is doomed to spend the rest of his life trapped in this day, so he tries to escape by committing suicide, but that does not work because he still wakes up at 6 am the following morning and it is still Groundhog Day. Each day, he changes his actions until he finally gets it right. Then the following morning, he wakes up to find that he has progressed to the next day, so that he has escaped the time loop.

Genre: Psychological – Waking Up in Another Time or Place.

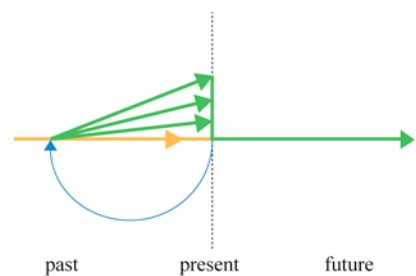
My Comments: The same external events keep happening day after day, but Phil is able to change the way he reacts to them and make different decisions about the way he is going to behave. Wherever he ends up, whether it is in his bed, in jail or even dead, as soon as the clock reaches 6 am the following morning, the day always resets itself to start of Groundhog Day. Phil is the only one who can remember that time has gone back. This continues until one day he makes a significant enough change to move out of the loop and into his future. Although this is a time loop, it is not a causal loop, as the past actions he will make the following day do not cause his present situation to form.

Time Travel Summary: The past is open because each time Phil is thrown back in time he changes his behaviour, which creates a new diverging timeline replacing the original one. This keeps happening until he wakes up the following day to find himself on a timeline that has a future beyond Groundhog Day. So it seems the future is closed, as there appears to be only one timeline with a future. Note that there were more different diverging timelines than shown in the diagram below:

Model of Time:

Open past, closed future

Diverging timeline



Harry Potter and the Prisoner of Azkaban (2004)

Director: Alfonso Cuarón.

040

Writing Credits: J.K. Rowling, Stephen Cloves.

Production Companies: Warner Bros. Pictures, 1492 Pictures, Heyday Films, P of A Productions Limited.

Distribution: Warner Bros. Pictures.

Actors: Daniel Radcliffe (Harry Potter), Emma Watson (Hermione Granger), Rupert Grint (Ron Weasley), Alan Rickman (Professor Severus Snape), Gary Oldman (Sirius Black), Emma Thompson (Prof. Sybil Trelawney), Maggie Smith (Prof. McGonagall), David Thewlis (Prof. Lupin)

Runtime: 141 minutes.

The Internet Movie Database User Rating: 7.7/10 81,359 votes

Overview: Hermione uses her time-turner to take her and Harry back three hours, so they can free Harry's godfather, but they must return to the place they leave to begin their time travel before the time they leave.

Plot Synopsis: Soon after Harry starts his third year at Hogwarts School of Witchcraft and Wizardry, he notices that his friend, Hermione, is acting strangely, as she is using a time-turning hourglass necklace to take herself back in time, so she can attend two classes simultaneously. Harry, Ron and Hermione go to save Buckbeak, the hypogrif (half eagle, half horse) from having his head chopped off. They are not able to do so and from a distance, they see the executioners axe coming down, but do not notice that he was chopping a pumpkin instead. Professor Dumbledore suggests that Hermione and Harry go back in time to help his wrongly accused godfather, Sirius Black, escape from prison and save Buckbeak. She places the chain around both of their necks and turns her device over three times. They arrive three hours into their past and can view themselves from a distance. Without being noticed, they then save Buckbeak from his execution by helping him to escape. Harry and Hermione fly on him to the tower to rescue Sirius Black, who then escapes on Buckbeak. They arrive back at the hospital wing where they observe themselves just about to start their time travel. Ron, lying in bed, sees them disappear in front of him and then notices them on the other side of the room. He asks them in amazement how they did that trick. Little did he realise that they had just left and returned on a time travelling trip.

Genre: Fantasy – Magic.

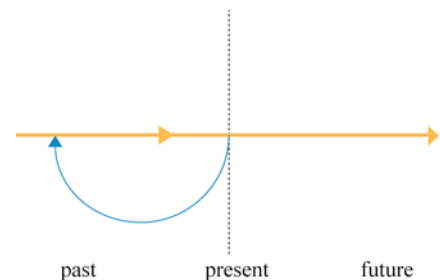
My Comments: This film has a few examples of the predestination paradox: Harry was saved from the dementors by what he thought was his dead father's ghost. During his time travel, he watches the attack from afar, but when the ghost does not appear, he casts a spell, which creates the apparition that saves the earlier version of himself. This causal loop could not have happened if he had not gone back in time. Another example was when Harry was hit in the head by a stone, which was actually thrown by Hermione when she went back in time. Had she not gone back in time, the stone would never have been thrown and there would have been an inconsistency in the storyline. Also, if they had not thought that Buckbeak has died, they would not have gone back to save him and he would have died.

Time Travel Summary: They go back in time and can see themselves, but when they change events, they realise that they are not changing anything, as they remember that these events already happened. These causal loops indicate that a fixed timeline was being used, and the past and future only appeared to be changing.

Model of Time:

Closed past, closed future

Fixed timeline with causal loops



Idiocracy (2006)

Director: Mike Judge.

041

Writing Credits: Mike Judge.

Production Companies: Twentieth Century-Fox Film Corporation.

Distribution: Twentieth Century-Fox Film Corporation.

Actors: Luke Wilson (Joe Bauers), Maya Rudolph (Rita), Dax Shepard (Frito).

Runtime: 84 minutes.

The Internet Movie Database User Rating: 6.4/10 27,123 votes

Overview: A guy with an average IQ and a prostitute are cryogenically frozen in pods for a year, but are forgotten until 2505. They awake to find clueless idiots running the world. He searches for a way back to his time.

Plot Synopsis: Two pods are cryogenically frozen for a year as part of the Pentagon's 'Human Hibernation Project'. One contains Joe, an army librarian with an average IQ, the other, a prostitute called Rita. The top-secret military experiment gets abandoned when the officer in charge is arrested due to an unrelated incident and the pods are forgotten. The pods are accidentally opened in 2505 and Joe and Rita find themselves in a strange future world: The dumb under-classes have out-bred the intellectuals, who became too career-focussed. So the world is now run by clueless idiots and Joe and Rita are the two smartest people in the world. They must adapt and re-educate the masses, as the economy has collapsed and people are starving due to crop failure. Joe soon becomes President of the United States, while looking for a time machine to take himself home. He eventually gives up and marries Rita; they have three children and live happily ever after.

Genre: Science Fiction - Cryogenic Freezing.

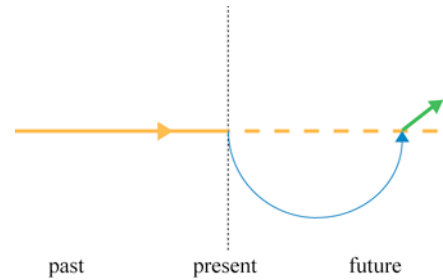
My Comments: See also other films with cryogenic freezing, such as *Forever Young* (1992), *Sleeper* (1973), *Demolition Man* (1993), *Vanilla Sky* (2001) and *Austin Powers: International Man of Mystery* (1997).

Time Travel Summary: Cryogenic freezing does not allow the past to be changed, but the time traveller's arrival in the future allows the future to be changed. Also, from the moment he leaves the timeline, his absence will cause a new timeline to be created for the world he has left, but without backwards time travel it is not possible to say whether it would have diverged or converged back. So he arrives on a future timeline, which may or may not be the same one that he left, hence the dashed line between the origin and his point of arrival in the following diagram.

Model of Time:

Undefined past, open future

Future timeline



If Only (2004)

Director: Gil Junger.

042

Writing Credits: Christina Welsh.

Production Companies: If Only Production Services Ltd., Outlaw Productions (I), Box Film (in association with), Bondesen-Graup, Intermedia Films, Love Spell Entertainment, Tapestry Films.

Distribution: Sony Pictures Home Entertainment.

Actors: Jennifer Love Hewitt (Samantha Andrews), Paul Nicholls (Ian Wyndham), Tom Wilkinson (Taxi Driver).

Runtime: 92 minutes.

The Internet Movie Database User Rating: 6.9/10 5,379 votes

Overview: Ian argues with his lover and then she is killed in a car accident. He goes back in time one day and tries unsuccessfully to change destiny all day, until he dies instead of her in the same car accident.

Plot Synopsis: Ian spends a day with his lover, Samantha, and right after an argument with him, she takes off in a cab. He runs after it, but watches helplessly, as it is hit by another car at traffic lights causing her death. The next morning, he is lying in bed cuddled up to her journal, when there is a flash of white light. He screams with shock when he notices she is lying next to him and then he realises that he has gone back one day in time. Everything that happened the day before seems to be happening again, not always the same way, but it still happens, no matter what he does to try and stop it. He spends the rest of the day with Samantha and learns to truly love her. After a wonderful evening, she climbs into a cab - he hesitates - but then decides to join her. The cab is involved in the same accident as before, except that this time, he is killed in the crash, not her. She is very upset. Six months later, she is performing on stage, as it appears she has gone on with her life to become a successful singer/songwriter.

Genre: Fantasy – Unexplained.

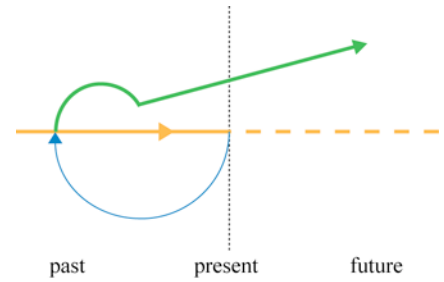
My Comments: Similar plot to the movie, *Three Days* (2001).

Time Travel Summary: The timeline continues to converge after every divergence, until at the end of the film, when he dies instead of her which causes the timeline to diverge off in a new direction. The model of time used has an open past and future with a double-well timeline.

Model of Time:

Open past, open future

Double-well timeline



If Only ... (1998)

aka *'The Man with Rain in His Shoes'*

Director: María Ripoll.

043

Writing Credits: Rafa Russo.

Production Companies: CLT, Escima, HandMade Films, Mandarin Films, Paragon Entertainment Corporation, Parallel Pictures, UFA International, Wild Rose Prods.

Distribution: Trimark Pictures.

Actors: Lena Headey (Sylvia Weld), Douglas Henshall (Victor Bukowski), Penélope Cruz (Louise).

Runtime: 91 minutes.

The Internet Movie Database User Rating: 6.5/10

1,049 votes

Overview: Two Spanish gypsies, who work as bin men in London, cast a spell that allows a regretful guy to travel back in time and correct his past mistakes. He finds that destiny still takes him to the same place, but this time he has no regrets.

Plot Synopsis: During the Notting Hill Carnival in London, Victor admits to his girlfriend, Sylvia that he is having an affair. She is heartbroken and throws him out of their flat. Victor is trying to win her back, but she tells him that she is now in love with Dave and is adamant that they are going to marry. Victor is distraught and while walking home in the pouring rain, he meets two Spanish gypsies. One blindfolds him and starts to spin him around, while the other starts to read a spell from a book. They laugh, while telling him that tomorrow will be a long time away for him. When he comes out of the spin, he finds that he has travelled back in time to the Notting Hill Carnival. This time, he does not tell Sylvia about the affair and stops seeing the other woman. He becomes the perfect partner, giving her everything she wants. However, she still meets Dave, so that this time it is her who is having the affair. Victor is heartbroken, but soon after falls in love with Louise and they become engaged. Meanwhile, Sylvia breaks up with Dave, regretting what she has thrown away with Victor. She tracks him down and suggests they get back together and stop making mistakes, but he says his new love, Louise, is not a mistake. Sylvia is distraught and while walking home in the pouring rain meets the same two gypsies. The inference is that they will give her the opportunity to go back in time and correct her mistake.

Genre: Fantasy – Magic.

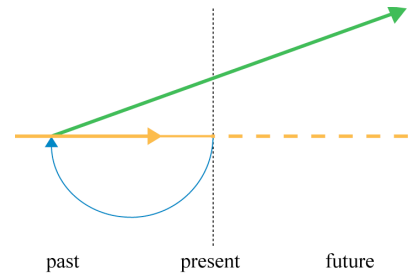
My Comments: Whoever goes back the furthest will create the new timeline that replaces all others.

Time Travel Summary: Victor is sent back in time and changes the past, thus creating a new and different future for himself.

Model of Time:

Open past, open future

Diverging timeline



It's a Wonderful Life (1946)

Director: Frank Capra.

044

Writing Credits: Philip Van Doren Stern (story), Frances Goodrich.

Production Companies: Liberty Films (II).

Distribution: RKO Radio Pictures.

Actors: James Stewart (George Bailey), Donna Reed (Mary Hatch Bailey), Lionel Barrymore (Henry F. Potter), Thomas Mitchell (Uncle Billy Bailey), Henry Travers (Clarence).

Runtime: 130 minutes.

The Internet Movie Database User Rating: 8.6/10 80,550 votes

Overview: A suicidal man wishes he had never been born. He meets an angel in disguise, who grants him his wish. He goes back in time and prevents his birth, thus creating an alternate reality in which he now lives.

Plot Synopsis: George Bailey has spent all of his life helping to fulfil the dreams of his fellow townspeople, in the process giving up all of his personal dreams. His uncle loses an envelope containing \$8K at the bank and as a result George's company will go bankrupt and he will be held responsible. He goes to a bridge to commit suicide by jumping off, as he learns that his life assurance policy is worth more than he is. He meets an angel there called Clarence, who will earn his wings, if he can save George. George tells Clarence that he wishes he had never been born, so Clarence grants him his wish by showing him an alternate history. They spend several days in this world, where none of his friends or family recognise him, as he had never been born. He can see how their lives turned out for the worse without him, thus realising what an impact his life had on the whole of the town. He returns to his world, happy to be alive and with his family and friends.

Genre: Psychological – Angels.

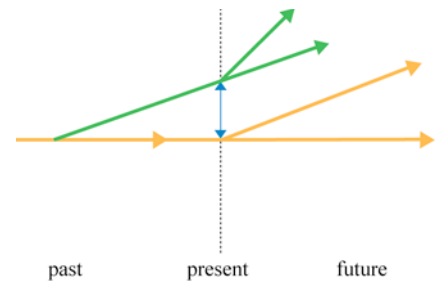
My Comments: Clarence, the angel, shows George an alternate timeline in which he was not born. Note similar concepts are used in the films, *The Family Man* (2000), and *Me Myself I* (1999).

Time Travel Summary: By seeing this alternate world, George is able to gain knowledge, which he brings back to his own timeline, thus changing his future for the better. He interacts with the alternate world, causing changes, but as he does not travel back in time in either timeline, the past of both timelines is undefined.

Model of Time:

Undefined past, open future

Parallel timeline



The Jacket (2005)

Director: John Maybury.

045

Writing Credits: Tom Bleecker, Mark Rocco.

Production Companies: Mandalay Pictures, Warner Independent Pictures, 2929

Productions, VIP 2 Medienfonds, VIP 3 Medienfonds, Rising Star, Section Eight.

Distribution: Warner Bros. Pictures.

Actors: Adrien Brody (Jack Starks), Keira Knightley (Jackie Price), Kris

Kristofferson (Dr. Thomas Becker), Jennifer Jason Leigh (Dr. Beth Lorenson)

Runtime: 103 minutes.

The Internet Movie Database User Rating: 7.0/10

27,074 votes

Overview: After being drugged, constrained in a straight jacket, then placed in a basement morgue drawer for many hours against his will, Jack is able to travel to his future and bring back valuable information to help people.

Plot Synopsis: Jack gets committed to a top-security mental asylum for a murder that he did not commit. Dr Becker conducts illegal experiments on him that involve him being drugged, constrained in a straight jacket, then placed in a basement morgue drawer for many hours. During this time, Jack is able to travel forward 15 years to 2007 and bring back valuable information to the present to help people. On his first trip to the future, he meets Jackie and learns that he will die four days after returning to the asylum. On one of his trips, he asks Jackie to take him to see the now retired Dr Becker, who says that he did not kill Jack. All he remembers is that the last time Jack came out of the drawer, he mentioned three names to him of the men he had previously tried to help. They ask him what the names were and he tells them. Jack laughs and says, "I came out of that thing and I told you those names, well who do you think told me about them? You did! I am in that drawer right now ... you are haunting yourself old man." While in the future, Jack is able to get a note to Jackie's mother, which he hopes will prevent her from dying. When back at the asylum, Jack slips on some ice and splits his head open. He asks to be put in the jacket before he dies. He goes back to the future on more time and meets Jackie at the point he first met her, however, she seems different. He finds out that her mother is still alive, so it seems he was able to cause the timeline to diverge. Jack remains in the future with Jackie because he cannot go back.

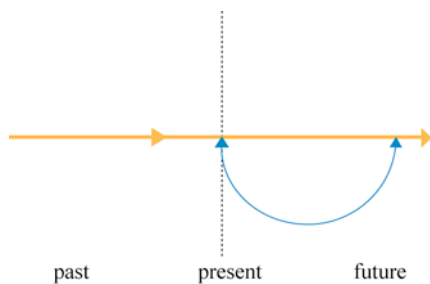
Genre: Psychological – Drug Induced.

My Comments: Jack has no live body to return to at the asylum, as he was unable to prevent his own death, so he has to remain in the future. The predestination paradox is at play here because the information Jack brings back is helping to create the events that he is observing in the future. The conversation that he has with Dr Becker in the future sets up a causal loop, as he brings back information that allows something to take place in the present that has already taken place, but would not have been able to without this information.

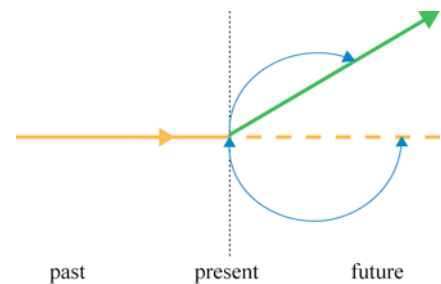
Time Travel Summary: Jack makes several return trips to the future and all of the changes he makes when he comes back to his present turn out to be causal loops, so he is not actually changing the timeline at all. It is only when he is able to save the life of Jackie’s mother that the timeline diverges. Just before he dies, he is able to travel to the future and see that the timeline has continued to diverge.

Model of Time: Undefined past, open future with a double-well timeline and causal loops.

His first trips caused the existing future to unfold:



His last trip created a different future:



Journey to the Center of Time (1967)

Director: David L. Hewitt.

046

Production Companies: Borealis Enterprises, Dorad Corporation.

Distribution: American General Pictures.

Writing Credits: David L. Hewitt.

Actors: Scott Brady (Stanton), Anthony Eisley (Mark Manning), Gigi Perreau (Karen White), Abraham Sofaer (Dr. 'Doc' Gordon), Austin Green (Mr. Denning).

Runtime: 82 minutes.

The Internet Movie Database User Rating: 3.3/10 235 votes

Overview: The three scientists push the limits of their time travel experiment too far, thus inadvertently creating a time warp. Their whole lab ends up 5,000 years into the future, then in the past during the time of the dinosaurs.

Plot Synopsis: When Stanton takes over his father's scientific research company, he wishes to see proof that progress is being made before he pours any more funds into their time travel project. The three scientists wish to prove they can travel further in time than the 24 hours they have managed so far, so they turn up the laser cycling, and increase the protons to full blast. This inadvertently creates a time warp, which takes the whole lab 5000 years into the future, where an army of aliens are trying to take over the Earth. When attempting to return to the present, they meet a ball of energy coming the other way, and in trying to avoid it, they overshoot, causing them to arrive on Earth during the time of the dinosaurs. Stanton comes back alone, but realises that he was the ball of energy coming back through time the other way and is destroyed. Mark and Karen manage to get back to their own time, but their calculations were not exact enough and they find they have travelled back to just minutes before they left. They can view past versions of themselves that are moving so slowly that they can hardly notice. They realise that they have disrupted the flow of time, and now exist in a parallel world outside of time. Mark says to Karen, "We are existing at such an accelerated time rate that we would appear as nothing but shadows to them!" and he predicts that, "two solid objects cannot occupy the space of one, I do not know what would happen ... but we would cease to exist!" Their only chance is to re-enter the time lab and go "to another Earth, another time."

Genre: Science Fiction - Creating Wormholes.

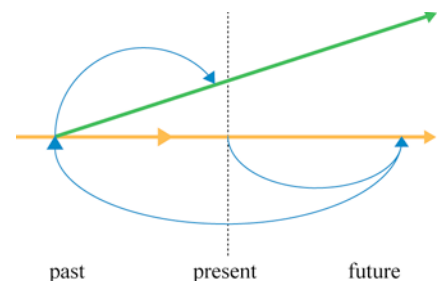
My Comments: The movie begins with the following voiceover: "During the span of our evolution, time has been measured by the journey of our planet through the darkness of our space. Scientists use our solar system and the cold vast regions of the universe as a giant timekeeper. Time has a quality as hazy and distant as the perimeter of own galaxy. The haze occasionally clears for those minds, which inquire into the very nature of the fabric of time itself and a glimpse of the true meaning of time is revealed. Time: from creation to now tugs towards all yesterdays almost as strongly as the unborn tomorrows that stretch toward all eternity. Some day, man will strike a balance between these two great universal forces: the past and the future and then man will make a fantastic journey to the centre of time." It is interesting to note that physics has no problems with two different objects from different times coming together in the same region of spacetime.

Time Travel Summary: The crew travel along the timeline to both the past and the future and are able to change them both. However when trying to return home, Mark and Karen find they have inadvertently created a parallel world where time moves more quickly.

Model of Time:

Open past, open future

Parallel timeline



Jubilee (1977)

Director: Derek Jarman.

047

Writing Credits: Derek Jarman.

Production Companies: Megalovision, Whaley-Malin Productions

Distribution: Cinegate Ltd.

Actors: Jenny Runacre (Queen Elizabeth I/Bod), Nell Campbell (Crabs), Toyah Willcox (Mad), Jordan (Amyl Nitrite), Hermine Demorlane (Chaos), Ian Charleson (Angel).

Runtime: 100 minutes.

The Internet Movie Database User Rating: 5.9/10 731 votes

Overview: For the amusement of Queen Elizabeth I, the court magician summons the spirit guide, Ariel, who takes them to late twentieth-century Britain, where they discover the punk values of anti-establishment and anti-royalty.

Plot Synopsis: For the amusement of Queen Elizabeth I, the court magician summons the spirit guide, Ariel (a character from Shakespeare's *The Tempest*), who promises to take her to the future. The queen and her escorts arrive in late twentieth-century Britain where they discover the punk values of anti-establishment and anti-royalty: law and order has broken down and Queen Elizabeth II has been murdered. We follow three punk girls in a documentary style format, who entertain themselves with drugs, alcohol and occasional murder for kicks.

Genre: Fantasy – Magic.

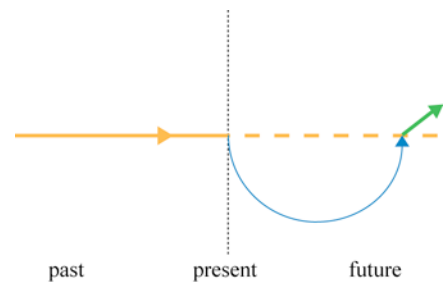
My Comments: The story would still have worked without the time travel, as it was not essential to the plot. It was only used to contrast the values of the past to those of the present. Another plot device could have been used with equal effect.

Time Travel Summary: A group travel into the future. It is not known whether their absence has made a difference to the future, or whether their arrival will make a difference to the future from that point on, as they do not go back in time.

Model of Time:

Undefined past, open future

Future timeline



Just Visiting (2001)

Director: Jean-Marie Poiré.

048

Writing Credits: Jean-Marie Poiré, Christian Clavier.

Production Companies: Hollywood Pictures, Société des Etablissements L. Gaumont.

Distribution: Buena Vista Pictures.

Actors: Jean Reno (Lord Thibault), Christina Applegate (Princess Rosalind/Julia),
Christian Clavier (Andre).

Runtime: 88 minutes.

The Internet Movie Database User Rating: 5.6/10 5,371 votes

Overview: A medieval lord and his servant wish to go one day back in time so that they might right a wrong. The wizard errs with his potion and his spell takes them forward in time to Chicago in the year 2000.

Plot Synopsis: In medieval times, Lord Thibault, is tricked into killing his fiancée, Princess Rosalind, at their wedding banquet. He and André, his serf, use a wizard's potion to go back in time one day to right the wrong, but the wizard errs with his potion and his spell takes them forward in time to the year 2000 and across the Atlantic Ocean to Chicago in the United States. The wizard realises his mistake and repeats the spell on himself. He eventually finds them and brings them back to 12th century Europe.

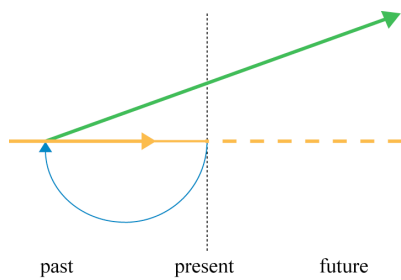
Genre: Fantasy – Magic.

My Comments: The original version of this film, *Les Visiteurs* (1993), was very similar in plot. The main differences were that it was set in France rather than America and that the protagonist is tricked into killing his fiancée’s father instead of her. The original was watched, but a review was not done, as it would have been identical in terms of how time was treated and hence they used the same model of time.

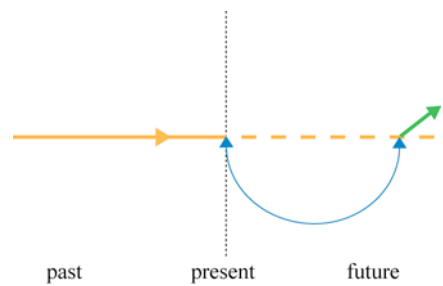
Time Travel Summary: Lord Thibault was intending to travel back through time to right a wrong, which suggests a model of time with an open past and a diverging timeline. When he and Andre arrived in the future, they were able to change the timeline there, so the future must also be open and diverging.

Model of Time: Open past, open future with a diverging timeline.

The intended trip:



The actual trip:



Kate and Leopold (2001)

Director: James Mangold.

049

Writing Credits: James Mangold, Stephen Rogers.

Production Companies: Konrad Pictures, Miramax Films.

Distribution: Miramax Films.

Actors: Meg Ryan (Kate McKay), Hugh Jackman (Leopold), Liev Schreiber (Stuart Besser), Breckin Meyer (Charlie McKay).

Runtime: 123 minutes (director's cut).

The Internet Movie Database User Rating: 6.2/10 17,720 votes

Overview: Stuart does some calculations and works out that a time portal appears for a few minutes every once in a while in NYC. By jumping off the Brooklyn Bridge, he passes through it and travels back one hundred years.

Plot Synopsis: Stuart does some calculations and figures out that a time portal appears for a few minutes every once in a while above the East River in New York. By jumping off the Brooklyn Bridge, he can pass through it to a time one hundred years before. He finds his great, great grandfather, Leopold, and returns several times to follow him around with a small camera. Leopold is under great family pressure to announce a bride, but has not found a girl he would like to marry. Eventually, Leopold spots Stuart and chases him to the Brooklyn Bridge and after a struggle, they both fall off it and pass through the portal together, reappearing in modern-day New York. Leopold falls in love Stuart's neighbour and former girlfriend, Kate. A week later, the portal opens up again and Stuart persuades Leopold to allow him return him to his past life. Kate later follows them through the portal because Stuart sees her on one of the photos he has since developed and realises that her future is also in the past.

Genre: Fantasy – Portals.

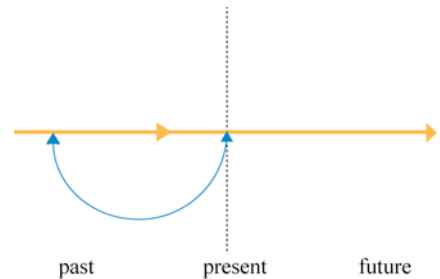
My Comments: Note the predestination paradox here: Kate had to return to the past to marry Leopold, or Stuart would never have been born.

Time Travel Summary: Stuart did influence the past when he was there, however, everything seemed to have converged by the time he returned to his own time. However, as Kate had to return to the past, this was always going to happen, so the past is fixed. Stuart was also meant to go there, otherwise Leopold would never have fallen in love with Kate. Although Kate disappears from the timeline at the end of the film, this does not change the future timeline, as she was always destined to go back in time at that point, so she never had a future beyond this point, so nothing was changed.

Model of Time:

Closed past, closed future

Fixed timeline with a causal loop



The Kid (2000)

Director: John Turteltaub.

050

Writing Credits: Audrey Wells.

Production Companies: Chester Films Inc., Junction, Walt Disney Pictures.

Distribution: Buena Vista Pictures.

Actors: Bruce Willis (Russ Duritz), Spencer Breslin (Rusty Duritz), Emily Mortimer (Amy).

Runtime: 104 minutes.

The Internet Movie Database User Rating: 5.9/10 11,911 votes

Overview: Russ finds a lost 8-year-old boy called Rusty and soon realises this is his younger self, who has slipped through time. Russ travels back to his childhood with Rusty to help him win a battle at school that will help to shape his life.

Plot Synopsis: Russ, a mean cynical image consultant has no romance in his life, is about to turn 40 and has blocked out all memories of his childhood. He finds a lost eight year-old child in his apartment called Rusty. He soon realises this is his younger self, who has slipped through time. Russ is not impressed with the chubby, timid boy, and Rusty is not impressed with his older self, who he considers an unmarried, loser who does not even have a dog and did not follow their dream to become a pilot. Russ travels back to 1968 with Rusty to help him win an important battle at school that will help shape his life, meaning that when Russ returns to his own time period, his life has changed for the better.

Genre: Fantasy – Portals.

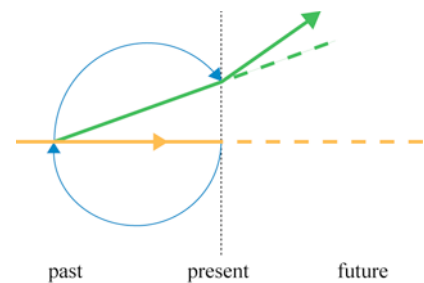
My Comments: He is in the past with his younger self, revisiting his childhood, I have no problem with that, but when he returns to his own time, surely he will arrive further along the new timeline and meet a grown-up version of Rusty on that timeline. It is not as if there will be an open space in his life waiting for him to slot into.

Time Travel Summary: Russ is able to change his past, when he travels back, which means the past is open in this film. When he returns to his own time, he finds that his life in the present has significantly changed, which means that the timeline has diverged. He also starts to behave differently because of the lessons he learnt when in the past. This causes the timeline to diverge again.

Model of Time:

Open past, open future

Diverging timeline



A Kid in King Arthur's Court (1995)

Director: Michael Gottlieb.

051

Writing Credits: Michael Part, Robert L. Levy.

Production Companies: Tapestry Films, Trimark Pictures, Walt Disney Pictures.

Distribution: Buena Vista Pictures.

Actors: Thomas Ian Nicholas (Calvin Fuller), Joss Ackland (King Arthur), Paloma Baeza (Princess Katey), Kate Winslet (Princess Sarah), Ron Moody (Merlin).

Runtime: 89 minutes.

The Internet Movie Database User Rating: 4.6/10 1,387 votes

Overview: Calvin falls through a crevice during an earthquake and eventually arrives in England during the times of King Arthur. He is able to communicate to the ghost of Merlin by looking down a magic well.

Plot Synopsis: A boy called Calvin is struck out in the last inning of a baseball game, so his team lose. Then suddenly, there is an earthquake and everyone dives for cover. The boy grabs his bag, but falls down through a crevice. He goes down a long way, eventually falling through the sky and landing on the notorious Black Knight during the times of King Arthur. He gains the favour of the king, who has lost his grip on his nation. The magician, Merlin, has passed away, but his ghost is able to communicate with Calvin via a magic well. It appears that Merlin's spell brought the wrong person to help Arthur regain his courage to take control of his kingdom again. Merlin strikes a deal with him: If he can help King Arthur to regain his confidence, then he will help Calvin get back to his own time. During his adventure, in which he helps Arthur keep his crown, Calvin gains courage and his self-respect. Calvin returns to his present during the baseball game, just as he is about to be struck. He steps up to the plate with his newfound courage and this time hits a home run. He notices Arthur and his daughter watching the game in the stands, looking like normal people from his time.

Genre: Psychological – Head Injury.

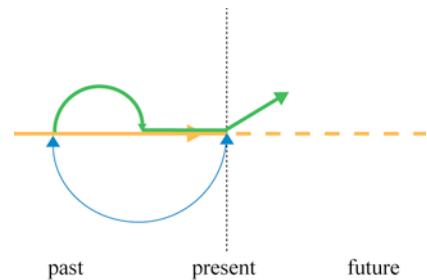
My Comments: Calvin helps King Arthur to become the legend that he was destined to be. His trip was part of a causal loop and causes a pre-destination paradox because without him going back, Arthur would not have become the great king written about in our history books.

Time Travel Summary: Calvin went back and changed the past, which caused the timeline to diverge. However on his return, his present world was unchanged, so the timeline in the past must have converged back again. We have to assume that if Calvin had not helped the king, someone else would have, as history tells us that Arthur did become a great king. During his trip, Calvin gained courage and self-respect, so when he returns, he is a different person. He hits the home run, so his team wins instead of losing, thus causing the timeline to diverge.

Model of Time:

Open past, open future

Converging timeline



The Lake House (2006)

Director: Alejandro Agresti.

052

Writing Credits: David Auburn (screenplay), Eun-Jeong Kim (original film).

Production Companies: Warner Bros. Pictures, Vertigo Entertainment, Village Roadshow Pictures, Sound for Film.

Distribution: Warner Bros. Pictures.

Actors: Keanu Reeves (Alex Wyler), Sandra Bullock (Kate Forster), Christopher Plummer (Simon Wyler).

Runtime: 102 minutes.

The Internet Movie Database User Rating: 6.8/10 26,724 votes

Overview: A mailbox at the Lake House contains a portal. Letters placed in the mailbox by the tenant in 2006 arrive in it in 2004 and are received by the previous tenant and vice versa.

Plot Synopsis: Alex is an architect and the new tenant of a Lake House in Chicago, who corresponds by mail with the former tenant, Kate, who is a doctor. Soon they discover that the Lake House mailbox is a portal sending their mail back and forth through time, as he is living in 2004 and she is living in 2006. After many letters, they start to fall in love and decide to meet. He goes to a party where he knows her former self will be, but finds that she has a steady boyfriend. Her next letter suggests that he books a dinner table two years ahead, which for her is the following day. She goes, but he fails to show because she later realises he has died in the meantime. She finds out how he died and warns him. He eventually gives up trying to find her and waits the two years, before they are re-united at the Lake House.

Genre: Fantasy – Portals.

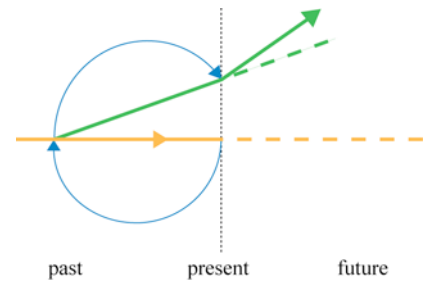
My Comments: This is a Hollywood remake of the Korean film, *Il Mare* aka *Siworae* (2001).

Time Travel Summary: Kate is able to save Alex's life by warning him of the accident that will kill him. Her message is able to travel back through time and cause the timeline to diverge, so that Alex is still alive in her present. His messages going forward in time are able to change her life in the present, thus causing the timeline to diverge again.

Model of Time:

Open past, open future

Diverging timeline



The Last Mimzy (2007)

Director: Robert Shaye.

053

Writing Credits: Bruce Joel Rubin (screenplay), Toby Emmerich.

Production Companies: New Line Cinema, Eyetronics USA, Michael Phillips Productions.

Distribution: New Line Cinema.

Actors: Chris O'Neil (Noah Wilder), Rhiannon Leigh Wryn (Emma Wilder), Joely Richardson (Jo Wilder), Timothy Hutton (David Wilder).

Runtime: 90 minutes.

The Internet Movie Database User Rating: 6.5/10 7,028 votes

Overview: A future civilisation is dying. Their scientists send a cuddly rabbit called Mimzy back through time to hopefully collect a healthy DNA sample that can be merged with theirs to save their race.

Plot Synopsis: A future civilisation is being wiped out due to their DNA having been corrupted by chemicals. Their scientists send a cuddly rabbit called Mimzy back through time to hopefully collect a healthy DNA sample that can be merged with theirs to save their race. After several failed attempts, they only have time for one last attempt: So the last Mimzy is sent back to 2007 in a box with other toys, which all have mysterious powers. A young girl, called Emma, finds these toys on a beach with Noah, her brother. They experiment with them and gain extraordinary talents. Mimzy is full of advanced electronics, which enables it to communicate telepathically with Emma. At one point she sheds a tear on Mimzy, which is the DNA sample it needs. The children work out how to activate the toys and this creates a wormhole back to the future through which Mimzy returns to save the future human race from extinction.

Genre: Science Fiction - Creating Wormholes.

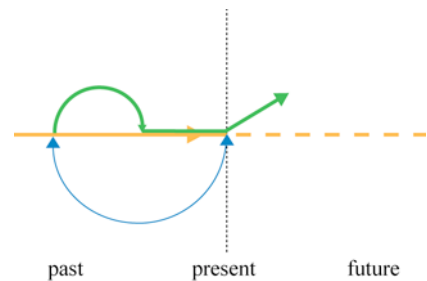
My Comments: Note that the scientists were not able to send any living being through the wormhole. This is another one of those movies where we do not see if there are any consequences. This is because the movie ends before Mimzy returns to the future. However, it is inferred that the mission was finally successful.

Time Travel Summary: Several Mimzy's were sent back over a period of time. Each one failed to gain a DNA sample, however the future generation's present was not altered, which means that any divergence caused to the timeline converged back again. The last Mimzy was successful, which infers that they are able to change their destiny by causing the timeline to diverge towards a different future.

Model of Time:

Open past, open future

Converging timeline



Lost Horizon (1937)

Director: Frank Capra.

054

Writing Credits: James Hilton (novel), Robert Riskin (screenplay).

Production Companies: Columbia Pictures Corporation.

Distribution: Columbia Pictures.

Actors: Ronald Colman (Robert 'Bob' Conway), Jane Wyatt (Sondra Bizet), John Howard (George Conway), Edward Everett Horton (Alexander P. 'Lovey' Lovett), H.B. Warner (Chang).

Runtime: 118 minutes.

The Internet Movie Database User Rating: 7.8/10 4,045 votes

Overview: A plane crashes in the Himalayas and the survivors are rescued and then taken back to Shangri-La, a place where time has slowed to a virtual standstill for its inhabitants, that is until they leave.

Plot Synopsis: In 1935, a group of white westerners escape from an uprising in the Chinese town of Baskul on a small plane, but it is skyjacked and crashes in the Himalayas killing the pilot. The survivors are rescued by a group of Tibetans and are taken back to Shangri-La, a place where time has slowed to a virtual standstill. A Catholic missionary called Father Perrault arrived in the region back in 1880 and eventually became the head lama of the hidden society. He is now a very old man and about to die. Robert Conway, a British diplomat, soon realises that their arrival was no accident: he had been bought there to take over from the lama. The other survivors all wish to leave initially, but one by one grow to like it there, except for Robert's brother, George, who arranges a way out for his local girlfriend and him. He convinces Robert to come with them, even though Robert has fallen in love with Sondra, another local girl. Once out of the region, George's girlfriend ages dramatically and dies. George is so distraught, that he commits suicide. Robert struggles on through the snow and is eventually rescued, but has suffered a severe memory loss. Whilst on a ship back to London, he remembers everything and decides to jump ship and head back to find Shangri-La. After several years of trying, he finally arrives at Shangri-La and is reunited with Sondra.

Genre: Fantasy - Unexplained.

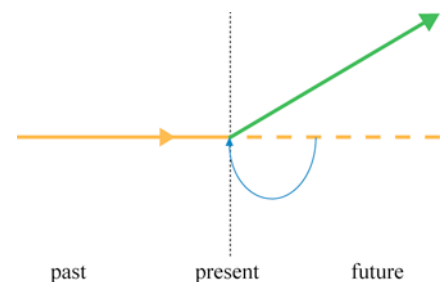
My Comments: Once people enter this region, time slows down for them, which means that they age very slowly compared to the outside world. So relative to the outside world, they are travelling forwards through time. However, once they leave the region, the years catch up with them and they start to age dramatically, so they are moving backwards through time relative to the rest of the world. Although backwards time travel takes place in this film, no one travels back in time to the past, so the past is undefined. Similar concepts are discussed in the film reviews of *A Matter of Life and Death* aka 'Stairway to Heaven' (1946), *Clockstoppers* (2002) and *Cashback* (2006).

Time Travel Summary: When a person enters this special region, time slows down for them, so they are effectively moving slowly forwards through time relative to the timeline of the outside world. When they leave the region, and cross to the outside world, they would appear much younger than a person who was born at the same time as them, but who had never entered the region. This is similar to the twin's paradox mentioned in the background chapter. Then they begin to age very quickly as they jump back in time relative to the timeline of the outside world. This causes their future years to pass extremely quickly, meaning that their future would be very different. Note nothing from their past can change due to them entering this region.

Model of Time:

Undefined past, open future

Diverging timeline



Lost In Space (1998)

Director: Stephen Hopkins

055

Writing Credits: Irwin Allen, Akiva Goldsman.

Production Companies: New Line Cinema, Irwin Allen Productions, Prelude Pictures.

Distribution: New Line Cinema.

Actors: William Hurt (Prof. John Robinson), Mimi Rogers (Dr. Maureen Robinson), Heather Graham (Dr. Judy Robinson), Lacey Chabert (Penny Robinson), Jack Johnson (Will Robinson), Gary Oldman (Spider Smith), Matt LeBlanc (Maj. Don West).

Runtime: 130 minutes.

The Internet Movie Database User Rating: 4.7/10

26,539 votes

Overview: The Robinson family are cryogenically frozen for the ten-year duration of their journey to Alpha Prime. Once there, they set up a 'hypergate', so vessels will be able to travel there instantaneously from the Earth.

Plot Synopsis: The Robinson family are travelling to Alpha Prime, the only other habitable planet. They are to remain cryogenically frozen in tubes for the ten-year duration of the journey and once there, set up a 'hypergate'. A companion one will be finished by then and will be orbiting Earth, so vessels will be able to pass instantaneously between the two hypergates to colonise Alpha Prime. Hyperspace exists beneath normal space and if you try to enter it without an exiting gate your exit point will be random. 16 hours into their mission, a robot has been programmed by the traitor, Dr Smith to destroy the Robinson family, all operating systems, and then the vessel Jupiter II. They survive, but are caught in the Sun's gravitational pull. Their only hope is to activate the hyperdrive without an exit gate to send them to an unknown part of the galaxy; hence they are 'Lost In Space'. They find a rescue ship that was looking for them many years ago and realise that they have not only travelled across space, but through time to the future. They end up crashlanding on a planet, which has a large bubble around an area of it. On entering it, they discover two scientists, who turn out to be an older Dr Smith and Will, their boy, who is now a grown man. They have been on the planet all this time and have invented a time machine, which Will is about to use to travel back and abort their original mission.

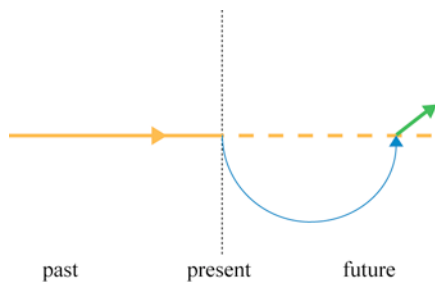
Genre: Science Fiction - Creating Wormholes.

My Comments: The other films with cryogenic freezing use the model of time with a closed past and open future.

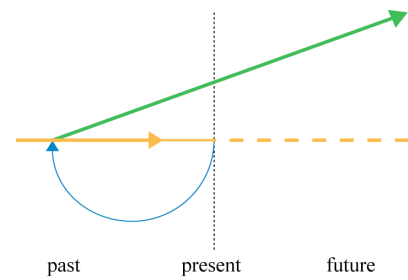
Time Travel Summary: They were using cryogenic freezing at the start of the movie, which is represented by the first image. Then their spaceship travelled forward in time using the hyperdrive, which is also represented by the first diagram. At the end of the movie, Will is about to use his time machine to travel back and abort his family's original mission, which is represented by the second diagram. Both diagrams fit within the same model of time.

Model of Time: Open past, open future, with a diverging timeline.

Space rocket:



Time machine:



A Matter of Life and Death (1946)

aka '*Stairway to Heaven*'

Director: Michael Powell, Emeric Pressburger.

056

Writing Credits: Michael Powell, Emeric Pressburger.

Production Companies: The Archers, Independent Producers.

Distribution: Universal Pictures.

Actors: David Niven (Peter Carter), Kim Hunter (June).

Runtime: 104 minutes.

The Internet Movie Database User Rating: 8.0/10

4,824 votes

Overview: A WWII pilot survives baling out of his plane without a chute over the English Channel when he should have died. He attends a celestial trial to ask for an extension to his life on earth, as he has fallen in love!

Plot Synopsis: Peter, a WWII pilot, bails out of his plane without a chute into the English Channel. He should have died, but gets washed up on a beach because the 'collector' (a type of angel) missed him in the fog. When the angel catches up with him, Peter refuses to go to the other side, as he has fallen in love with an American girl. They have several conversations over a period of days. Whenever the 'collector' arrives from heaven to speak to Peter, time is temporarily frozen all around them on Earth. People become statues until the 'collector' has finished his conversation and leaves. Finally, Peter agrees to attend a celestial trial to ask for an extension to his life on earth.

Genre: Psychological – Angels.

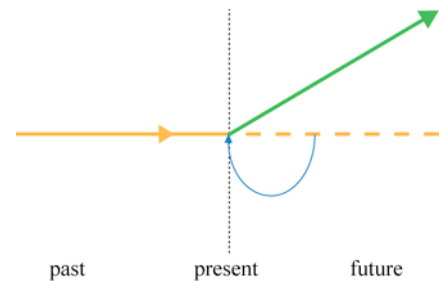
My Comments: During Peter’s conversations with the collector, time is frozen for those around him, but he continues to age. Therefore, when time unfreezes, he travels back in time to the moment when the freezing period began, so this is technically time travel. Similar concepts are discussed in the film reviews of *Clockstoppers* (2002), *Cashback* (2006) and *Lost Horizon* (1937).

Time Travel Summary: During the ‘timeout’ Peter is able to discuss his situation with the angel and make better decisions than he would have, if time had not frozen. So he does go back in time to the beginning of the timeout and makes different decisions, which cause the timeline to diverge, thus changing his future. In the following diagram, the time freezing begins at the origin and then he skips back to the point when it begun and rejoins those around him on a new diverging timeline. Nothing from his past can change due to these timeouts, so the past is undefined.

Model of Time:

Undefined past, open future

Diverging timeline



Me Myself I (1999)

Director: Pip Karmel.

057

Writing Credits: Pip Karmel.

Production Companies: Société des Etablissements L. Gaumont, Les Films du Loup, Australian Film Finance Corporation.

Distribution: Hollywood Pictures.

Actors: Rachel Griffiths (Pamela Drury), David Roberts (Robert Dickson).

Runtime: 104 minutes.

The Internet Movie Database User Rating: 6.0/10 1,671 votes

Overview: After a car accident, a single middle-aged girl temporarily swaps places with a married version of herself in an alternate world. They both find out whether the grass is any greener on the other side.

Plot Synopsis: Pamela is middle-aged and is frustrated to be still looking for Mr Right. One day, she sees a photo of an old boyfriend, whose proposal she turned down and wonders what her life would have been like if she had agreed to marry him. After a car accident, she slips into a parallel world and meets a married version of herself. They chat briefly and then swap lives. They eventually swap back their lives and she continues with her old life, no longer having any regrets about what might have been, as she realises that the grass was no greener on the other side.

Genre: Psychological – Head Injury.

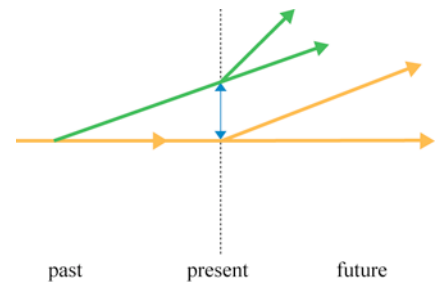
My Comments: There is no backwards time travel here, only sideways travel between alternate universes. Similar concepts to the films, *The Family Man* (2000) and *It's a Wonderful Life* (1946).

Time Travel Summary: Pamela returns to her original timeline armed with information that will help her make better decisions. It is inferred that she will create a different future for herself and that the future is therefore open. Her interaction in the parallel world will also cause its timeline to diverge. The past of both timelines is undefined, as backwards time travel is not addressed in this film.

Model of Time:

Undefined past, open future

Parallel timeline



Meet the Robinsons (2007)

Director: Stephen J. Anderson.

058

Writing Credits: Michelle Bochner, Stephen J. Anderson, William Joyce (book).

Production Company: Walt Disney Animation Studios, Walt Disney Pictures.

Distributor: Buena Vista Home Entertainment.

Actors: Angela Bassett (Mildred), Daniel Hansen (Lewis), Jordan Fry (Lewis), Matthew Josten (Michael "Goob" Yagoobian), Stephen J. Anderson (Bowler Hat Guy/Grandpa Bud/Tallulah).

Runtime: 95 minutes.

The Internet Movie Database User Rating: 6.9/10

12,862 votes

Overview: A boy's son travels back in time to meet his father when he was a boy. He takes him in his flying time machine thirty years forward to 2037. They then travel back to the present to stop the bowler hat guy.

Plot Synopsis: Lewis is a 12-year-old inventor, who lives in an orphanage and dreams of finding his mother. A boy called Wilbur Robinson comes up to Lewis and tells him that he is from the future. He says that a man wearing a bowler hat has stolen one of his time travel vehicles. Wilbur then takes Lewis in his flying time machine thirty years forward to 2037, where Lewis spends a day with Wilbur's quirky family. Wilbur talks Lewis into helping him defeat the bowler hat guy in order to preserve the utopian future in which the Robinsons live. However, the bowler hat guy wins, causing Wilbur to be erased from existence, so that Doris and the other robotic bowler hats now control the world. Lewis eventually fixes the broken time machine and uses it to go to the precise moment and location where the bowler hat guy signs a contract that dooms humanity. He tells him that, once Doris has what she wants, she will get rid of him. Doris tries to kill Lewis, but he merely says, "I will NEVER invent you!" This causes the hat to vanish into oblivion and the horrible future is then transformed into the utopian future of before. Wilbur arrives back into existence and they use the time machine to go back and find Lewis' mother. He learns that he can only realise his full potential when he's willing to let go of his past and his mistakes and "keep moving forward". Lewis finally figures out that Wilbur is his son from the future.

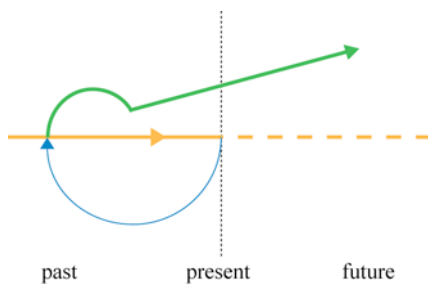
Genre: Science Fiction – Time Travel Vehicle.

My Comments: Based on William Joyce’s book *A Day with Wilbur Robinson*. Like in the film, *Back to the Future Part II* (1989), Lewis needs to go back along the timeline to the point where the new branch was created and stop the event that created it, so that the original timeline can be restored.

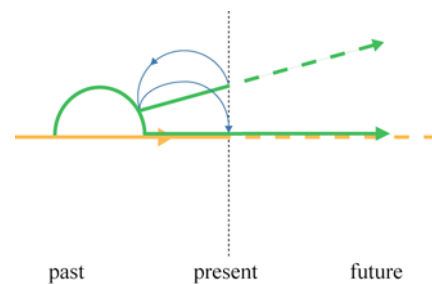
Time Travel Summary: This story is set in a utopian future. It begins with Wilbur travelling back in time, where he meets his father as a boy called Lewis. He takes him on his time machine vehicle to show him the futuristic world he comes from. When they arrive, nothing has changed, despite the fact that Wilbur has removed his own father from the timeline. This infers a converging timeline. However, the bowler hat guy and Doris travel back in time and when they make a significant change, this causes the timeline to diverge instantly from that point on. This causes the original branch of the timeline to collapse and be replaced by the new one, so this movie is using a double-well timeline. Lewis now finds himself on the unpleasant new timeline, so travels back to stop the bowler hat guy from making that change, which prevents the timeline from diverging, causing the previous timeline to collapse and be replaced by the original one. He then goes forward to the present where he finds that Wilbur now exists again in his utopian world. At the end of the movie, Lewis has to return to his own time, so that he can grow up and become Wilbur’s father.

Model of Time: Open past, open future, with a double-well timeline.

The bowler hat guy causes a divergence:



Lewis goes back and restores the original timeline and then goes forward along it:



The Navigator: A Mediaeval Odyssey (1988)

Director: Vincent Ward.

059

Writing Credits: Geoff Chapple, Kely Lyons.

Production Companies: Arenafilm, Australian Film Commission, John Maynard Productions, New Zealand Film Commission.

Distribution: Circle Films.

Actors: Bruce Lyons (Connor), Chris Haywood (Arno), Hamish McFarlane (Griffin).

Runtime: 90 minutes.

The Internet Movie Database User Rating: 7.1/10 1,215 votes

Overview: In 14th century England, a boy describes a vision of himself escaping the Black Death with some friends by tunnelling to the other side of the world. When they arrive in New Zealand, they have travelled forward to 1988.

Plot Synopsis: In 14th century England, a group of villagers from Cumbria are worried about the advancing Black Death plague that has been spreading across Europe. It has not reached their village yet, but is heading that way. A group of men are sitting in a pit discussing this with a boy called Griffin, who is having a vision. He sees them escaping the Black Death by tunnelling to the other side of the world. They arrive in New Zealand, but have somehow travelled through time, as it is now 1988. At the end of their modern-day adventure, the boy dies, by falling from a church tower. He then finds himself back in the pit with the men and realises the whole episode was a vision, but a very meaningful one. The older men think it means that only one person needs to die for the village to be saved. It turns out that Connor, his older brother, has the Black Death. We see Griffin's coffin floating out across the lake at the end of the movie.

Genre: Psychological – Visions.

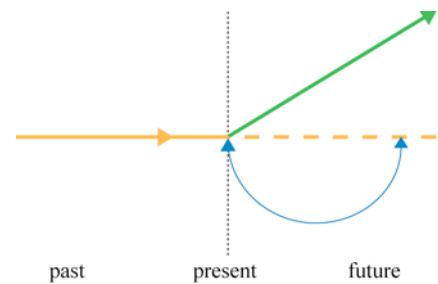
My Comments: When Griffin returned from his trip, he thought he must have just experienced a vision of the future, even though it seemed very real at the time. We know that it was an accurate representation of modern-day New Zealand, so it was more than just a symbolic dream. So whether it was a vision or he actually travelled to the future, I am going to treat this as time travel.

Time Travel Summary: Based on information obtained from their journey to the future, they were able to make decisions in their present, thus causing the timeline to diverge in the future.

Model of Time:

Undefined past, open future

Diverging timeline



The One (2001)

Director: James Wong.

060

Writing Credits: Glen Morgan, James Wong.

Production Companies: Revolution Studios, Hard Eight Pictures.

Distribution: Columbia Pictures.

Actors: Jet Li (Gabe Law/Gabriel Yulaw/Lawless), Carla Gugino (T.K. Law/Massie Walsh), Delroy Lindo (MVA Agent Harry Roedecker/Gas Station Attendant), Jason Statham (MVA Agent Evan Funsch), James Morrison (Officer Bobby Aldrich).

The Internet Movie Database User Rating: 5.5/10 18,710 votes

Overview: There is one life-force energy that pervades all parallel universes and it is distributed equally amongst each being in each universe. So, if one person dies, the energy is redistributed amongst the remaining others.

Plot Synopsis: Many parallel universes make up a 'multiverse'. The Multiverse Authority (MVA) is an organization that polices wormhole travel between these parallel universes. There is one life-force energy that is distributed equally through each of the different parallel versions of every living creature. So, if one dies, the energy is redistributed amongst the survivors. Gabriel Yulaw, an MVA agent, realises this when he kills one of his multiverse counterparts (MVCs) in self-defence. In order to become invincible, he spends the next two years travelling to 122 parallel universes to kill his remaining MVCs. Each time he gains more power, until there are only two versions remaining: himself and a police officer called Gabe Law.

Genre: Science Fiction - Creating Wormholes.

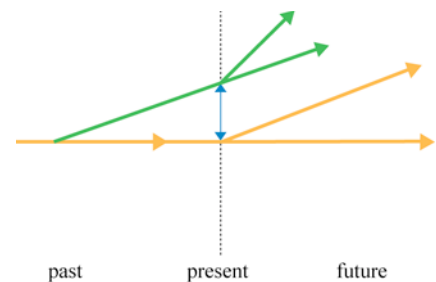
My Comments: This movie involves wormholes and parallel universes, but not time travel as such. By killing people in parallel universes, he is not affecting the past, but is affecting the future, as the energy is being redistributed, hence making him more powerful each time. One of the arguments against time travel is the violation of the conservation of energy within any closed system, as discussed earlier. Here each universe is not considered a closed system, therefore the conservation of energy can only be applied over the multiverse.

Time Travel Summary: The past is not addressed in this movie, so we cannot say if it is open or closed, we can only say that it is undefined. Gabriel returns to his own timeline armed with extra energy and knowledge from a parallel timeline, so he is able to create a different future and cause the timeline to split. As he is killing someone in each alternate timeline and removing part of its energy, he is also causing that timeline to split.

Model of Time:

Undefined past, open future

Parallel timeline



Peggy Sue Got Married (1986)

Director: Francis Ford Coppola.

061

Writing Credits: Jerry Leichtling, Arlene Sarner.

Production Companies: Delphi V Productions, TriStar Pictures, Zoetrope Studios.

Distribution: TriStar Pictures.

Actors: Kathleen Turner (Peggy Sue Kelcher Bodell), Nicolas Cage (Charlie Bodell), Joan Allen (Maddy Nagle), Jim Carrey (Walter Getz), Helen Hunt (Beth Bodell).

Runtime: 103 minutes.

The Internet Movie Database User Rating: 6.2/10 10,285 votes

Overview: A middle-aged housewife faints at her high school reunion, then wakes up to find she has gone back 25 years and is now a teenager again. She tries to change her destiny by making different choices this time around.

Plot Synopsis: In 1985, Peggy Sue is a 43-year-old housewife attending her high school reunion. She faints on stage and suffers a head injury that causes her to wake up 25 years before. She finds herself in her teenage body, but with her adult mind and in her last year of high school. She tries to change her destiny by making different choices, but the more she tries, the more events conspire to lead her down the same path. She finally wakes up in 1985 in a hospital bed, with her soon-to-be divorced husband at her side. She now views him differently after her jaunt into the past and can make new choices that will lead her to a different future.

Genre: Psychological – Head Injury.

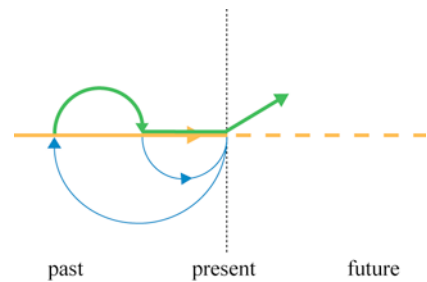
My Comments: The more she tries to change things, the more nothing changes. This is indicative of a diverging timeline, rather than a causal loop, as her actions were not causing anything to happen.

Time Travel Summary: Peggy Sue is changing her past, but not her destiny, as the timeline keeps converging. However, she returns from the past wiser than before, so is able to create a new future for herself.

Model of Time:

Open past, open future

Converging timeline



The Philadelphia Experiment (1984)

Director: Stewart Raffill.

062

Writing Credits: Wallace C. Bennett (story), Charles Berlitz (book).

Production Companies: Cinema Group Ventures, New Pictures.

Distribution: New World Pictures.

Actors: Michael Paré (David Herdeg), Nancy Allen (Allison Hayes), Eric Christmas (Dr. James Longstreet), Bobby Di Cicco (Jim Parker).

Runtime: 102 minutes.

The Internet Movie Database User Rating: 6.1/10 3,589 votes

Overview: During a naval experiment in 1943, two sailors are accidentally pulled through a wormhole to 1984. Soon after, one is sucked back, while the other has to go into the wormhole to close it. He then stays in 1984 to be with his newfound love.

Plot Synopsis: In May 1943, during an experiment in Philadelphia Harbour, to make the USS Eldridge and its crew invisible to radars, the ship suddenly becomes totally invisible and extremely radioactive. Two sailors, David and Jimmy, jump overboard during the experiment, but instead of landing in the sea, they are sucked forward through a wormhole and land in a closed military zone in the middle of the Nevada desert in 1984. Jimmy still has severe radioactivity on his hand and this seems to attract lightning. The military notice that a wormhole has opened above this town in Nevada. They fire a probe into it and see the original USS Eldridge suspended in there. While being treated in hospital, a storm passes over and Jimmy's radioactive hand attracts the above lightning, which comes through the window and on striking him, causes his body to slowly fade out of this time. Meanwhile, David goes on the run with Alison, a girl he meets and they end up back in California to discover that Jimmy made back in time and is now an old man. However, he is unwilling to talk to David about it, as no one believed him when he returned and he was admitted to a mental hospital. NASA then launch David into the centre of the vortex, where he boards the ship and destroys its generators, which are keeping the vortex open. He returns to earth and continues to live in 1984 with Alison.

Genre: Science Fiction – Creating Wormholes.

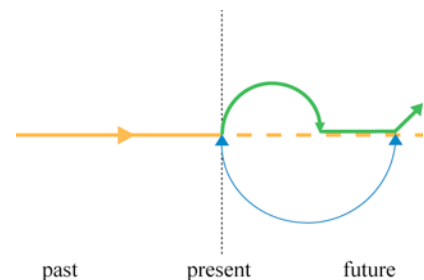
My Comments: Based on supposedly ‘real’ experiments that took place in Philadelphia harbour at that time. Dr. James Longstreet explains the physics to the sailors, “Your ship and our town are trapped together ... somehow the electromagnetic fields created in the two experiments, one in 1943 and the other now, cross-connected and they created a vortex, a hole in the space-time continuum and you fell through it. In 1943 when the Eldridge came back, the hole closed behind it; this time it stayed open. It is like a giant vacuum sucking everything into it! The source of the energy explosion in the vortex is the energy generators on the Eldridge.”

Time Travel Summary: It seems that any changes that caused the timeline to diverge by Jimmy returning to it in 1943 were not permanent, as the timeline had converged back again by 1984. If not, we would have noticed a difference to David’s world in 1984 soon after Jimmy had gone back and told people what had happened to him. So the timeline for both of them is identical, the only difference is that Jimmy made a return trip, whereas David’s was one-way only.

Model of Time:

Undefined past, open future

Converging timeline



Philadelphia Experiment II (1993)

Director: Stephen Cornwell.

063

Writing Credits: Wallace C. Bennett and Don Jakoby.

Production Companies: Trimark Pictures.

Distribution: Trimark Pictures.

Actors: Brad Johnson (David Herdeg), Marjean Holden (Jess), Gerrit Graham (Dr. William Mailer/Friedrich Mahler), John Christian Graas (Benjamin Herdeg), James Greene (Professor Longstreet).

Runtime: 97 minutes.

The Internet Movie Database User Rating: 4.4/10

579 votes

Overview: A stealth bomber goes backwards in time and by mistake arrives in Germany during WWII. The Germans are able to use it and go on to win the war. David goes back in time to fix the mistake.

Plot Synopsis: It is now nine years after the ending of *Philadelphia Experiment* (1984), and David is raising his son alone. Professor Longsheet, who developed the original technology, tries to stop Dr Mahler and his team of scientists from starting the experiments again by explaining that his original Philadelphia Experiment cut a hole through the space-time dimension. However, Mahler insists that the process has now been refined such that time is no longer a variable, so that the potential for error is virtually zero. In order to get more funding, the scientists try to prove how well the system works by transferring *The Phoenix*, a stealth bomber, from America to Germany. Unfortunately, it goes backwards in time, so that it arrives in Germany during the middle of WWII and because of this, the Germans go on to win the war. David, still in 1993, is knocked to the ground by the shock waves and when he gets up, he finds his country is run by Nazi Germans. David finds Longsheet and volunteers to go back in time. Longsheet says, "If David succeeds, this world will cease to exist and no-one will remember it except for David." David arrives in Germany during WWII, but finds Mahler has followed him and is about to warn his father. David blows up the stealth bomber before it takes off and during his escape, kills Mahler's father, which causes Mahler to be disintegrated. David steps into the vortex and reappears in modern-day America, where he is re-united with his son.

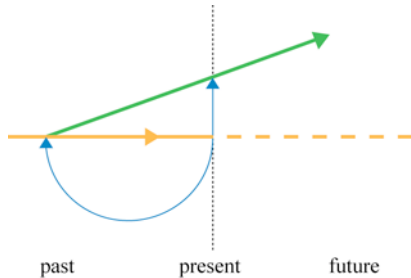
Genre: Science Fiction - Creating Wormholes.

My Comments: Dr Mahler disintegrates as soon as his father is killed, which means that his father had not yet got his mother pregnant. However, if he had no son, then Mahler would not exist and there would be no reason for David to come back in time to kill him, which of course creates a grandfather paradox. An interesting question here is when did Mahler Snr actually impregnate his wife because we know he was about to take off in the stealth bomber and that he would die in the explosion, when dropping the bomb.

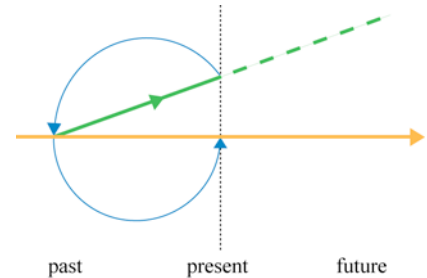
Time Travel Summary: As the bomb is dropped and the past is changed, a whole new timeline is instantly created, which diverges away from the original one, as it collapses. In the present, David is thrown from the old timeline to the new one, due to his unique DNA.

Model of Time: Open past, open future with a diverging timeline.

The bomber goes back in time and David is thrown onto the new timeline:



David goes back in time and restores the original timeline, then returns:



Planet of the Apes (1968)

Director: Franklin J. Schaffner.

064

Writing Credits: Pierre Boulle (novel), Michael Wilson.

Production Company: APJAC Productions, Twentieth Century-Fox Film Corporation.

Distributor: Twentieth Century-Fox Film Corporation.

Actors: Charlton Heston (George Taylor), Roddy McDowall (Cornelius), Kim Hunter (Zira).

Runtime: 112 minutes.

The Internet Movie Database User Rating: 8.0/10 42,845 votes

Overview: A spaceship crashes on an unknown planet with a similar climate to Earth. The dashboard shows the Earth's year as 3978 AD, so it seems they have jumped forward 1215 years by mistake.

Plot Synopsis: Captain Taylor is on an American spaceship that left Cape Kennedy six months ago. The dashboard shows the year on Earth to be 2763 A.D. According the theory of a scientist called Dr Hesline, the earth should have aged nearly 700 years since they left, as their ship has been travelling at nearly the speed of light. He says, "In deep space, everything seems different: time bends, space is boundless." All of the crew go into a deep sleep for the remaining 12 months of their journey and awake to find their ship crashed on an unknown planet with a similar climate to Earth. The dashboard now shows the Earth's year as 3978 AD, so it seems they have jumped forward another 1215 years. They estimate that they are "320 light years from Earth, on an unnamed planet in orbit around a star in the constellation of Orion." They soon find it is a planet dominated by apes with human slaves who are savage mutes. Taylor realises at the end of the movie that they are actually back on earth, but in a distant future where mankind has screwed up.

Genre: Science Fiction – Time Travel Vehicle.

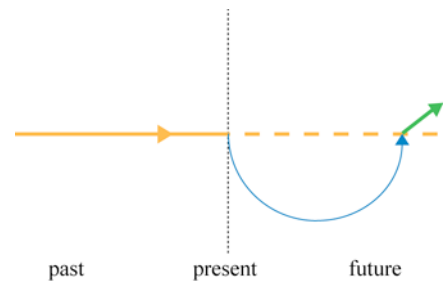
My Comments: The theory of a scientist called Dr Hesline obviously refers to Einstein’s Special Theory of Relativity. Travelling extremely fast through space will cause time to slow down on the vessel relative to an object like the Earth that is moving at a much slower speed. Time will seem to be passing normally to both the crew of the ship and to the inhabitants of Earth, but when they meet again, their clocks will be out of sync. In this case 1215 years out of sync. The science is very sound in this movie and as no one goes back in time, there are no temporal paradoxes to explain.

Time Travel Summary: The past is not changed, but the future timeline obviously diverges away from the original.

Model of Time:

Undefined past, open future

Future timeline



Planet of the Apes (2001)

Director: Tim Burton.

065

Writing Credits: Pierre Boulle (novel), William Broyles Jr. (screenplay).

Production Companies: Twentieth Century-Fox Film Corporation, The Zanuck Company.

Distribution: Twentieth Century-Fox Film Corporation.

Actors: Mark Wahlberg (Captain Leo Davidson), Tim Roth (General Thade), Helena Bonham Carter (Ari).

Runtime: 119 minutes.

The Internet Movie Database User Rating: 5.5/10 58,170 votes

Overview: All the digital clocks stop on a spaceship when it enters an electromagnetic storm. A man launches a pod, then its onboard clock races through the years to about 2600 AD, as he crash-lands it on a planet.

Plot Synopsis: A spaceship approaches an electromagnetic storm in the year 2029 and all of the digital clocks stop. The crew launch a chimp in a pod to investigate, but lose communication with him. One of the crew, called Leo, launches himself in another pod to get his chimp back from within the cloud. A burst of energy sends the pod spinning and Leo notices the onboard clock racing through the years to about the year 2600 AD. His pod enters the atmosphere of a planet and crash-lands. He discovers that an ape called General Thade rules the planet, along with other apes, gorillas and orang-utans. He tracks down his spaceship, which appears to have also crash-landed on the planet, but centuries before. He assumes that the rulers of the planet are all descended from the animals that were onboard his ship and the humans from his fellow crewmembers. The chimp that he was originally chasing in the storm then arrives in his pod making a safe landing. He takes this pod and launches himself back into space hoping to travel back to his own time. Once out of orbit, he heads straight for the electromagnetic storm. The onboard clock shows the years counting down from about 2600 to 2100. He navigates back to Earth and makes a crash landing in Washington DC. Police cars immediately surround his pod and then the officers approach him with loaded guns, but to his astonishment, they are all apes. He notices a shrine to General Thade, who appears to have travelled back in time even further than he did.

Genre: Science Fiction - Finding Portals.

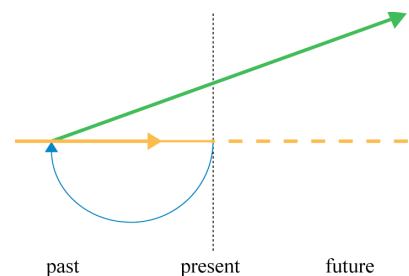
My Comments: The original 1968 classic of the same title used time dilation in order to travel forwards in time. However in this version of the movie, a portal is used that is caused by time being distorted in an electromagnetic storm cloud in outer space. The reason for this is probably because at the end of the movie, Leo wants to travel back to his own time and this cannot be done using time dilation, but can be done by going back through a portal. Another issue is as follows: Let us assume the apes are alarmed that Leo has gone back in time. They know that he will warn humans of the past about the consequences of their actions and make sure that he can convince them to change their ways so that the planet is never taken over by apes. This may take some time for him to accomplish, but if and when he succeeds, they fear that they would cease to exist, as their timeline would collapse. So they need to develop time travel and go back in time to just before he arrives, so that when he does, they can take care of him. This is not dissimilar to *Back to the Future Part II* (1989) when Doc and Marty have to go back and stop Biff from changing the timeline.

Time Travel Summary: Whoever goes back the furthest in time, creates the timeline that will replace all others.

Model of Time:

Open past, open future

Diverging timeline



Playing Beatie Bow (1986)

Director: Donald Crombie.

066

Writing Credits: Peter Gawler, Irwin Lane.

Production Companies: South Australian Film.

Distribution: CEL

Actors: Peter Phelps (Judah/Robert), Imogen Annesley (Abigail Kirk), Mouche Phillips (Beatie Bow), Nikki Coghill (Dovey).

Runtime: 93 minutes.

The Internet Movie Database User Rating: 5.8/10 85 votes

Overview: Abigail puts on an old-fashioned white dress and stitches on to it an antique lace collar. She does not realise it, but this will allow her to travel back in time. She is transported back to Sydney Town in 1873.

Plot Synopsis: Abigail puts on an old-fashioned white dress and stitches on to it an antique lace collar. She does not realise it, but this will allow her to travel back in time. She follows a shoeless little girl around the Rocks area of Sydney, but when they touch, the past and the present overlap and they are transported back to where the girl came from: Sydney Town in 1873. After an adventure lasting a few days, she manages to fulfil a few prophecies about her coming. She leaves the man she has fallen in love with to return to her time, where she meets a modern guy who looks just like the one she left behind (both played by Peter Phelps).

Genre: Fantasy – Portals.

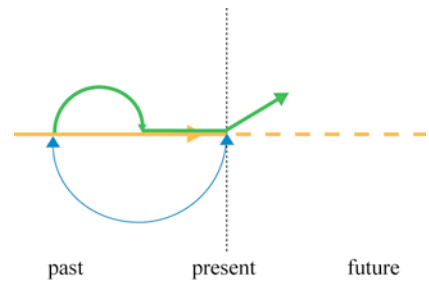
My Comments: This film has a similar storyline to *A Connecticut Yankee In King Arthur's Court* (1949), but set in Sydney, Australia.

Time Travel Summary: When Abigail returns, the timeline has converged as everything appears as she had left it. However, whether her future will change is not clear. She will certainly have learned something from her travels, so we have to assume she will make different decisions than before and hence the future is open.

Model of Time:

Open past, open future

Converging timeline



Premonition (2007)

Director: Mennan Yapo.

067

Writing Credits: Bill Kelly.

Production Companies: TriStar Picture, Metro-Goldwyn-Mayer, Hyde Park Films, Offspring Entertainment, Brass Hat Films.

Distribution: Sony Pictures Entertainment.

Actors: Sandra Bullock (Linda Hanson), Julian McMahon (Jim Hanson).

Runtime: 110 minutes.

The Internet Movie Database User Rating: 5.6/10 18,925 votes

Overview: Linda lives the seven days of a traumatic week of her life out of order. She wakes up each morning never sure which day of that week she will experience next. When she has completed them all, life continues normally from that day onwards.

Plot Synopsis: Linda wakes up on a **Thursday** and after breakfast, she is visited by a policeman, who tells her that her husband, Jim, died in a car accident the day before. She wakes up the next morning confused, as Jim is still alive, until she realises that it is the **Monday** before the accident. She then wakes up the next day, which is the **Saturday** after Jim's death, as the funeral arrangements are being made. That evening, she finds her mother has her committed to a mental asylum. She then wakes up the next day and it is the **Tuesday** before. She tries unsuccessfully to stop Jim going on his business trip the following day. When she wakes up the next day, it is **Friday** and she finds out Jim is having an affair. She then wakes up and it is the previous **Sunday**. She makes love to Jim and tells him that she has had a dream that he is going to die. When she wakes up, it is now **Wednesday**, the morning of Jim's accident. He has already left, so she chases after him to try and stop him. The paradox here is that she causes the accident by getting him to do a U-turn in the middle of the highway. Once she has lived each day of that week out of order, the timeline continues on as normal. It seems that she is able to change her own destiny, by coping better with his death because she does not get admitted to a mental institution and goes on to have a happy life.

Genre: Psychological – Waking Up in Another Time or Place.

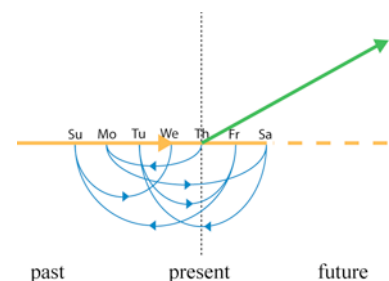
My Comments: I had to watch this movie twice before I thought I knew what was going on. However, it took the reading of several websites and a third viewing before I finally realised that the days of her week were being lived out of order. As each change always started when she woke up in the morning, each day could have just been a series of dreams, just premonitions of one or several possible futures. At the end of the film, the timeline has diverged and she stops seeing events as bad, and accepts that they were meant to happen.

Time Travel Summary: Linda changes events on the timeline every day of the week, but cannot prevent her husband's death on the Wednesday. The more that she tries to change things, the more her actions cause the predicted events to take place, like for example, Jim's death. Therefore the timeline prior to Wednesday always converges, so that her premonitions about the future are accurate. However, at the end of the film, we are led to believe that she puts to good use everything that she has learned during the week and is creating a new future for herself after the Wednesday (once all seven days have been experienced) because she does not end up in the mental asylum on the following Saturday.

Model of Time:

Closed past, open future

Double-well timeline with causal loops



Retroactive (1997)

Director: Louis Morneau.

068

Writing Credits: Michael Hamilton Wright, Robert Strauss.

Production Companies: Cohiba Pictures.

Distribution: Orion Pictures Entertainment.

Actors: James Belushi (Frank), Kylie Travis (Karen), Shannon Whirry (Rayanne), Frank Whaley (Brian).

Runtime: 91 minutes.

The Internet Movie Database User Rating: 6.3/10 1,616 votes

Overview: A scientist is doing time travel experiments on a mouse. A young woman runs into his lab and is accidentally sent back 20 minutes in time. She then visits him again, but he does not recognise her, as they have not met yet.

Plot Synopsis: Brian is a lab scientist doing Retroactive Experiment #12 on a mouse. His twelfth time travel experiment will be his last, as he is about to be shut down by the Pentagon. Any subject passed through the machine will have total recollection of all that has happened, but the scientist will have no memory of the events. Karen suddenly enters his lab trying to escape from Frank, a madman chasing her with a gun. Brian accidentally knocks his keyboard, which triggers his time machine and catapults her back 20 minutes in time. She re-lives the experience, but her efforts to change it for the better only make it worse. She runs away from Frank again and back to the lab, where Brian, of course does not recognise her, as he has not met her yet. She goes back in time again, but takes him with her, so that this time, he will remember what is going to happen and will be able to call the police. However, this time, even more people get killed. She and Brian end up back at the lab as hostages of Frank, who insists he is sent back for a couple of hours, so he can relive the experience of killing everyone all over again. After a big fight, Brian and Karen are flung back a couple of hours to the point in the story when the film begun. This last time, when Frank pulls up to give her a lift, she refuses to get in. She stops the police car that follows soon after and tells the cop about Frank. Then Brian picks her up and by the time they arrive at the gas station, everyone is dead except Frank's wife, who has just shot him. The policeman tells Karen and Brian to drive on ahead as there is nothing they can do, as more police cars are arriving.

Genre: Science Fiction – Transporting Body Through Time.

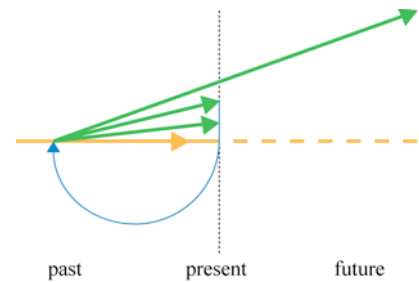
My Comments: Whoever goes back the furthest in time will create a new timeline that replaces all others. It seems that going back in time and changing past events will not always make for a better future, just like in the film, *The Butterfly Effect* (2004).

Time Travel Summary: The past is open because it is changed and the timeline diverges each time someone goes back. Karen seems to be stuck in an endless time loop, but she does finally escape from it, just like Phil Connors did in the movie, *Groundhog Day* (1993). Although both films use the same timeline diagram (as shown below) they have different models of time. Phil has no choice about his future and it is therefore closed. Because she is using a time machine, Karen can choose to keep going back in time until she arrives at a favourable future, so the future in this film is therefore open. Note that there were more diverging timelines in the film than shown in the diagram below:

Model of Time:

Open past, open future

Diverging timeline



***Returner* (2002)**

aka '*Ritana*'

Director: Takashi Yamazaki.

069

Writing Credits: Kenya Hirata, Takashi Yamazaki.

Production Companies: Amuse, Fuji Television Network, Imagica Corp., Robot, Shirogumi, Toho Company.

Distribution: Samuel Goldwyn Films.

Actors: Takeshi Kaneshiro (Miyamoto), Anne Suzuki (Milly), Kirin Kiki (Xie).

Runtime: 116 minutes.

The Internet Movie Database User Rating: 6.7/10 4,070 votes

Overview: In 2084, invading aliens are overrunning the Earth. A teenage girl is sent back in time to 2002, just as the first alien is arriving. She tries to find him and work out why the invasion started.

Plot Synopsis: Milly is a teenager living on Earth in 2084. Invading aliens are overrunning the human race, so she is sent back in time to 2002, just as the first alien is arriving. She tricks hit man, Miyamoto, into helping her find this first alien and to work out how the war began, so they can prevent it. They discover that a mafia boss, named Mizoguchi, caused the war by kidnapping the first alien for his own reasons, causing a whole fleet of them to come looking for him. When her mission is complete, Milly wishes to return to her time, but is unable to figure out how to do that.

Genre: Science Fiction - Transporting Body Through Time.

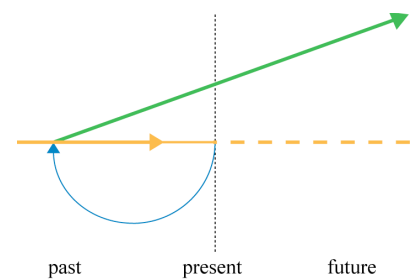
My Comments: Without her returning home, we will never know if Milly was able to stop the future invasion. If the future were predestined, then her actions would have made little difference, as the timeline would have converged. If the model of time had a parallel timeline, she would have only created a new parallel destiny and the old timeline would have remained unchanged.

Time Travel Summary: The model of time used in this movie is the one that suggests Milly did make a difference by completing her mission, thus causing the timeline to diverge so that the invasion can be avoided.

Model of Time:

Open past, open future

Diverging timeline



Run Lola Run (1998)

aka '*Lola Rennt*'

Director: Tom Tykwer.

070

Writing Credits: Tom Tykwer.

Production Companies: X-Filme Creative Pool, Westdeutscher Rundfunk, Arte.

Distribution: Bavaria Film International.

Actors: Franka Potente (Lola), Moritz Bleibtreu (Manni), Herbert Knaup (Vater),
Nina Petri, (Jutta Hansen), Armin Rohde, (Herr Schuster).

Runtime: 81 minutes.

The Internet Movie Database User Rating: 8.0/10 67,545 votes

Overview: A day in Lola's life is repeated three times with very different outcomes. At the end of each of the first two versions, she jumps back in time and starts again, remembering some things from the previous version each time.

Plot Synopsis: This movie was made up of three different versions of the same story. Each had the same initial inputs, but slight changes in each story as it unfolds, give very different outcomes à la *Butterfly Effect* (2004). At the end of the first story, Lola is shot dead by the police and then we see her talking in bed with her boyfriend, Manni. The second story unfolds with Manni getting killed, and again they are back in bed talking together at the beginning of the same day. The third story then unfolds and ends with a desirable outcome, so they do not have to go back in time to the beginning of the day, like the ending of *Groundhog Day* (1993).

Genre: Psychological – Waking Up in Another Time or Place.

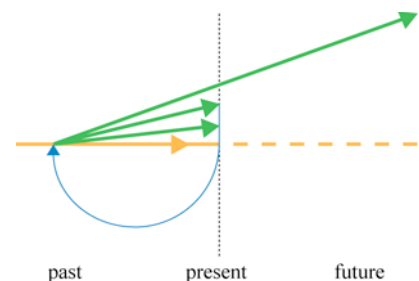
My Comments: It is clear that these are not in parallel universes because Lola has a residual memory of the previous stories each time: She remembered how to open the safety catch of the gun, which she had learned in the first story. She remembered actions that did not work in the previous stories, so she tried something different the following times, like going to the casino instead of robbing the bank. So if these movies are not alternate histories existing in parallel worlds, that leaves several possible explanations: 1) The first two stories were visions experienced in her dreams, that helped her when the third story began, which was in fact a reality. 2) The first version was reality and the following two were her dreams of what might have been. 3) The second was reality and the other two dreams. 4) The first story was reality, but she was able to time travel back and experience the day again. The second story was a new reality and she time travelled back again after that. This meant that the third story became the final modified reality and at the end of it, she was able to move on with her life. Of course this interpretation is open to debate.

Time Travel Summary: Using the fourth interpretation from above would require a model of time with an open past and future and a diverging timeline.

Model of Time:

Open past, open future

Diverging timeline



Slaughterhouse Five (1972)

Director: Roy Hill.

071

Writing Credits: Kurt Vonnegut Jr. (novel), Stephen Geller.

Production Company: Universal Pictures, Vanadas Productions.

Distributor: Universal Pictures.

Actors: Michael Sacks (Billy Pilgrim), Ron Leibman (Paul Lazzaro), Eugene Roche (Edgar Derby), Sharon Gans (Valencia Merble Pilgrim), Valerie Perrine (Montana Wildhack).

Runtime: 104 minutes.

The Internet Movie Database User Rating: 7.1/10 3,640 votes

Overview: Based on a novel of the same title about a man who becomes “unstuck in time”. He jumps in and out of time experiencing different parts of his life over and over again, but they always play out exactly the same.

Plot Synopsis: Billy jumps in and out of time experiencing different parts of his life over and over again, but every part always plays out exactly the same. When he leans back to rest, he often drifts into a trance, and finds himself in another random period of his life. We see him reliving different parts of his life, including when he is shot dead as an old man. At one point, some aliens abduct him and take him to their planet, Tralfamadore, where time and free will do not exist. The Tralfamadorians can see him, but he cannot see them, as he is told that they live in the fourth dimension. He asks when he can leave and is told, “You are here, you have always been here and you will always be here... We have visited 31 inhabited planets in the universe, we have studied reports on a hundred more, and only on Earth is there any talk of free will!” Back on Earth, he is on stage giving a talk about Tralfamadore and when he tells the audience that he is about to be shot, they gasp. He tells them, “If you protest, if you think death is a terrible thing, then you’ve not understood what I’ve said ... it’s time for me to be dead for a little while.” A member of the audience, who has threatened to kill Billy since they were in the same prisoner of war camp, pulls out a gun and shoots him dead. The movie ends on the timeless planet with Billy with his new girlfriend, Montana, holding their newborn son.

Genre: Psychological – Psychosis.

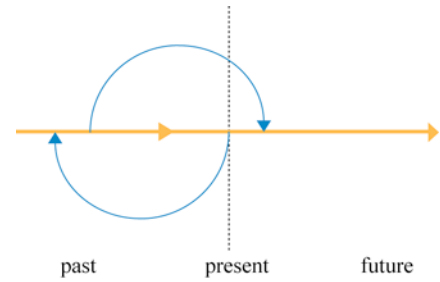
My Comments: Billy is thrown in and out of the timeline, entering and exiting it at seemingly random points during his life. He often repeats different sections of his life over and over again, but is never able to change any of them.

Time Travel Summary: Taking the start of the movie to be the present, the timeline would have random jumps along it, with the past and future always being fixed.

Model of Time:

Closed past, closed future

Fixed timeline



Sleeper (1973)

Director: Woody Allen.

072

Writing Credits: Woody Allen, Marshall Brickman.

Production Companies: Rollins-Joffe Productions.

Distribution: United Artists.

Actors: Woody Allen (Miles Monroe), Diane Keaton (Luna Schlosser).

Runtime: 89 minutes.

The Internet Movie Database User Rating: 7.3/10 11,722 votes

Overview: The time capsule of a man, admitted for cryogenic immersion as an involuntary patient by his cousin in 1973, is found in the woods by the Underground Movement 200 years later.

Plot Synopsis: In 1973, Miles Munroe's minor peptic ulcer was repaired at St Vincent's Hospital in Greenwich Village, but complications set in and he never regained consciousness. So his cousin admitted him for cryogenic immersion, as an involuntary patient. 200 years later, the time capsule containing his cryogenically frozen body is found in the woods. His data card states that he was a 35-year-old clarinet player, who was a part owner of the Happy Carrot Health Food Store. Doctors help him to regain consciousness, but he thinks that he is in New York in 1973. They tell him to go to the headquarters the Underground Movement in the Western District, as they want him to find out what the Aires Project is. They believe it is a secret plot to destroy the Revolutionary Movement. They tell him that they only defrosted his capsule because they wanted someone who has no record in their time. He explores this future world of confessional robots and orgasmatron booths, which have replaced sex and he never returns to 1973.

Genre: Science Fiction - Cryogenic Freezing.

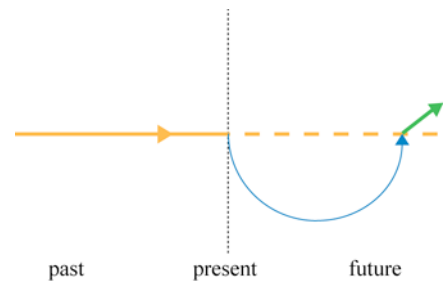
My Comments: Compare with other films that use cryogenic freezing, such as *Forever Young* (1992), *Idiocracy* (2006), *Demolition Man* (1993), *Vanilla Sky* (2001) and *Austin Powers: International Man of Mystery* (1997).

Time Travel Summary: As with the other movies where there is cryogenic freezing and no subsequent backwards time travel, the past is undefined and the future is open. The timeline will diverge from the moment he leaves it due to his absence, however without backwards time travel, we cannot say whether it will have converged back before he arrives in the future. The timeline is certainly changed by his arrival, but we are not told whether it will continue to diverge, or converge.

Model of Time:

Undefined past, open future

Future timeline



***Sliding Doors* (1998)**

Director: Peter Howitt.

073

Writing Credits: Peter Howitt.

Production Companies: Intermedia Films, Mirage Enterprises, Miramax Films, Paramount Pictures.

Distribution: AMLF.

Actors: Gwyneth Paltrow (Helen Quilley), John Hannah (James Hammerton), John Lynch (Gerry), Jeanne Tripplehorn (Lydia).

Runtime: 99 minutes.

The Internet Movie Database User Rating: 6.8/10 20,378 votes

Overview: A running girl just misses her train. Time is rewound and this time, she passes through the sliding doors of the train. The two parallel realities then continue towards contrasting futures.

Plot Synopsis: Helen is sacked from her job, so leaves work earlier than usual. At the train station, as she is running down the stairs to the platform, she bumps into a girl with a doll, which delays her by only a couple of seconds. Just before she gets to her train, the sliding doors close, causing her to have to wait for the next one. Then, without explanation, time rewinds and we see Helen running down the stairs again. However, this time the girl with the doll is pulled out of the way by her mother, which means that Helen gets to the sliding doors of the train just in time to board. The story then continues with two parallel timelines: In one timeline she leaves her cheating boyfriend, and ends up in a loving relationship with James, the man she met on the train. In the other, she returns home later, so does not find out that her boyfriend has another lover until near the end of the film. She experiences some parallel events, for example in both lives, she ends up in hospital after suffering a life-threatening injury, while being pregnant. In one life, Helen dies and James is distraught, while in the other, she survives the accident, but the baby does not. She tells her boyfriend to leave her for good. Later, the nurse tells her she had a lucky escape, and she replies, "You can say that again!" On her way out of the hospital, the sliding doors of the elevator close just as she arrives. However, the person inside opens them again and she steps inside to meet James for the first time in this timeline.

Genre: Fantasy - Unexplained.

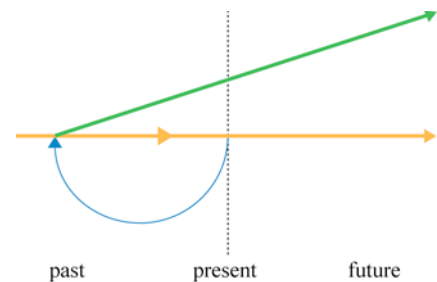
My Comments: The parallel timelines are similar in some ways and not in others: When she feels dizzy and nearly faints in one timeline, the same happens in the other. When she is on the River Thames watching a boat race in one timeline, she is walking by the river with a friend in the other and comments that she somehow knew there would be a boat race on The River Thames that day. Helen died in the second timeline that had branched off from the original. It is not clear if the whole world had split into two parallel timelines, or if only her personal timeline had split. If the latter is the case, then that timeline ended with her death, which means that it was only a temporary tangential timeline as in *Donnie Darko* (2002). When she meets James in the elevator at the end, he asks her a Monty Python question, and she surprises him by giving him the answer. She had learned this from him in the other timeline. So like *Donnie Darko* at the end of his movie, it seems she had retained some memory from the tangential timeline, even if only sub-conscious. We are left with the impression that they will go on to form the loving relationship that was foreshadowed in her other timeline.

Time Travel Summary: Time rewinds itself by only a few seconds, but it is enough to show us a different past, which leads to a different future, so both are open, but the two timelines exist in parallel.

Model of Time:

Open past, open future

Parallel timeline



***Slipstream* (2005)**

Director: David van Eyssen.

074

Writing Credits: Louis Morneau and Phillip Badger.

Production Companies: ApolloProMedia GmbH & Co. Filmproduktion KG, Fiction Film & Television Limited, Motion Picture Corporation of America, Sci Fi Pictures.

Distribution: Lions Gate Films Home Entertainment.

Actors: Sean Astin (Stuart Conway), Ivana Milicevic (Sarah Tanner), Vinnie Jones (Winston Briggs), Kevin Otto (Jake Hallman).

Runtime: 89 minutes.

The Internet Movie Database User Rating: 4.6/10 1,512 votes

Overview: Stuart has a hand-held time travel device that he has stolen from a classified project called 'Slipstream'. It allows the user to travel back ten minutes in time. So he uses it to repeatedly withdraw money from a bank.

Plot Synopsis: Stuart has a hand-held time travel device that he has stolen from a classified project called 'Slipstream'. It allows the user to travel back a maximum of ten minutes in time. So he uses it in a bank to keep going back five minutes, just after he has withdrawn \$2,000 and as he is carrying the cash, it accumulates each time he does so. Each time, he tries a different chat-up line on the teller, but never manages to impress her. FBI agent Sarah and her partner are in the bank tracking Stuart, as they are suspicious of his movements. The bank is then held up by a bunch of English bank robbers led by Winston, and there is a brief shoot-out, which leaves Sarah's partner dead. Winston steals the Slipstream device on his way out of the bank. The rest of the movie involves Stuart and Sarah trying to get it back. At the end of the movie, Stuart, Sarah and Winston use the device to go back to the moment before the bank robbery. Winston aborts the robbery, so there is no shoot-out and Sarah's partner does not die. Stuart then uses it to go back to the very beginning of the movie to avoid being caught by the FBI for using the device for personal gain.

Genre: Science Fiction – Hand-held Time Travel Device.

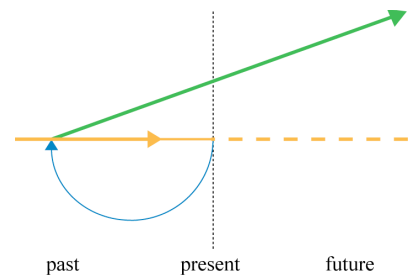
My Comments: The movie begins with the following voice-over: “Life happens in four dimensions, subtract time from the equation and all you are left with is space: no motion, no change. Take away time and you change everything we know, everything we believe, everything we understand. Imagine a stopped clock, there would be no rush hour, no more rushing to get there because you would never be late. There would be no birth, no death, no more broken hearts, summer vacations would never end, you could never lose a job, your wife could never leave you, there would be no crime, no war, nothing new of any kind, nothing old. No will be, no want to be, no has been, just one long uninterrupted ‘is’. It is hard to imagine as all we know is that time passes, we are taught it from the cradle to the grave that ‘time waits for no man’ ... Time does not exist as we know it, even the universe is not what it appears to be because it takes the light from those distant stars millions of years to get here. You are seeing into the past, gazing out at a galaxy that might not even be there any more. You are not looking at the night sky, you are looking into the heart of a time machine!”

Time Travel Summary: By going back and aborting the robbery, a different diverging timeline is created, which leads to a new future.

Model of Time:

Open past, open future

Diverging timeline



***Somewhere In Time* (1980)**

Director: Jeannot Szwarc.

075

Writing Credits: Richard Matheson (novel & script).

Production Companies: Rastar Pictures, Universal Pictures.

Distribution: Universal Pictures.

Actors: Christopher Reeve (Richard Collier), Jane Seymour (Elise McKenna), Christopher Plummer (William Fawcett Robinson).

Runtime: 103 minutes.

The Internet Movie Database User Rating: 7.0/10 7,082 votes

Overview: A man experiments with time travel using repeated autosuggestion until he returns to 1912. He gives a young lady his pocket watch, which creates a time loop for that object, as she had already given it to him in 1980 as an old lady.

Plot Synopsis: The day before Elise dies of old age, she approaches Richard, a young writer, gives him a pocket watch and says four words: "Come back to me!" He is intrigued and his research tells him that she was a beautiful and famous stage actress around 1912. He asks a former philosophy teacher of his, who is the author of a book called *Travels Through Time*, if time travel is possible. He is told that he once had limited success going back in time for a short period using self-hypnosis. He used autosuggestion over and over again in order to dissociate himself entirely from the present. The essential factor is the location; it has to be done in an old building from that era, with all modern objects moved out of sight, as the recognition of them would pull him back to the present. Richard experiments with this method until he perfects it and returns to 1912. He finds the young Elise and courts her, giving her his pocket watch, thus creating a time loop for that object. They fall in love and all goes well until one day he finds some modern-day coins in his suit pocket, which remind him of his other life and cause him to slip back through time to the present. He wakes up lying on the floor of the old hotel from where he departed. After many attempts, he cannot manage to return and eventually dies of a broken heart. The movie ends with his soul leaving his body and heading for the light, where he is reunited in a timeless dimension with the soul of Elise.

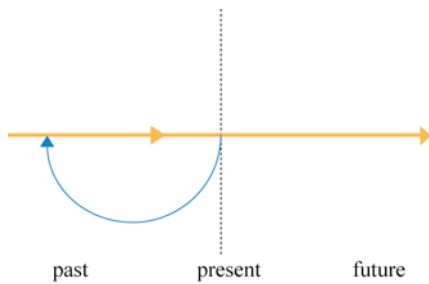
Genre: Psychological – Hypnosis.

My Comments: When time loops occur in a self-consistent universe, a time traveller trying to alter the past, intentionally or not, only causes the known history to take place, he is not able to change the course of history. So when Richard goes back in time, he is apparently changing people’s lives, but in fact he is causing history to happen the way it needs to happen in order to create his present world the way it is.

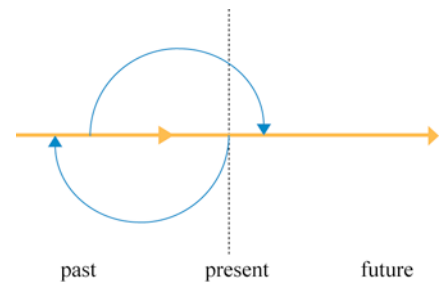
Time Travel Summary: So both the past and future are fixed. Richard does go back and always goes back and always gives Elise the pocket watch. There can be no other timeline. The watch is caught in a time loop, but Richard is not, as he returns to the point just after he left the timeline and continues along the fixed timeline.

Model of Time: Closed past, closed future with a fixed timeline and a causal loop.

Pocket watch:



Richard:



A Sound of Thunder (2005)

Director: Peter Hyams.

076

Writing Credits: Ray Bradbury, Thomas Dean Donnelly (screen story).

Production Companies: Franchise Pictures, Crusader Entertainment, ApolloMedia, Baldwin Entertainment Group, Dante Entertainment, ETIC Films, Epsilon Motion Pictures, Forge, QI Quality International GmbH & Co. KG, Signature Pictures.

Distribution: Warner Bros. Pictures.

Actors: Armin Rohde (John Wallenbeck), Heike Makatsch (Alicia Wallenbeck), Jemima Rooper (Jenny Kruse), David Oyelowo (Payne), Wilfried Hochholdingner (Dr Lucas), Edward Burns (Travis Ryer), Ben Kingsley (Charles Hatton).

Runtime: 110 minutes.

The Internet Movie Database User Rating: 4.0/10 7,649 votes

Overview: A travel company in 2055 is sending tourists back through time to the prehistoric era. During one trip, a butterfly is accidentally killed and when they return home, disastrous changes are taking place.

Plot Synopsis: A travel company in 2055 is sending tourists back through time to the prehistoric era with guns to shoot dinosaurs like game. They are very careful and have three rules: nothing is left behind there, nothing is brought back and nothing is changed. The only kill they ever make is an animal that is about to die, so that they do not change the course of history. On one trip, a tourist accidentally kills a butterfly when he leaves the designated path, which means when they return home, disastrous changes have taken place. Further changes continue to happen, one by one, as they continually arrive in ripples of time. The company employees must go back through time to rectify the mistake before it is too late.

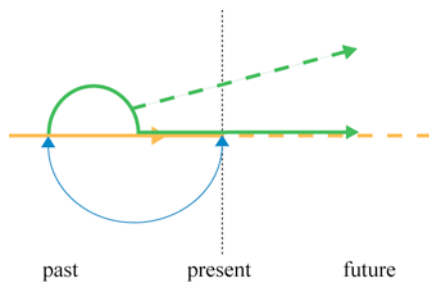
Genre: Science Fiction - Transporting Body Through Time.

My Comments: The killing of a butterfly appears to be insignificant compared to a dinosaur, but this is the nature of the Butterfly Effect, as discussed in the background chapter.

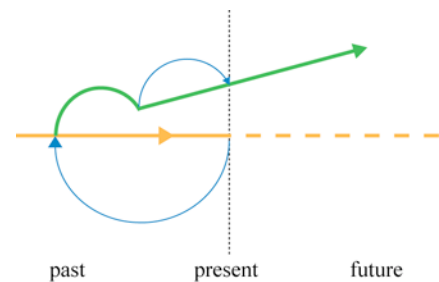
Time Travel Summary: The timeline diverges whenever the time tourists kill the dinosaur, but then converges back before they return to their own time. However, by killing the butterfly, they have made a significant enough change to cause the timeline to diverge forever, so when they try to return to their present, they move along the new timeline to an alternate world.

Model of Time: Open past, open future with a double-well timeline.

Just the dinosaur is killed:



The butterfly is also killed:



The Spaceman and King Arthur (1979)

aka '*Unidentified Flying Oddball*'

Director: Russ Mayberry.

077

Writing Credits: Don Tait.

Production Companies: Walt Disney Productions.

Distributor: Buena Vista Distribution Company.

Actors: Dennis Dugan (Tom Trimble), Jim Dale (Sir Mordred), Ron Moody (Merlin), Kenneth More (King Arthur), John Le Mesurier (Sir Gawain), Rodney Bewes (Clarence).

Runtime: 93 minutes.

The Internet Movie Database User Rating: 4.6/10

305 votes

Overview: A spaceship has been designed to travel faster than the speed of light. An accident sees the ship crash-land in England during the time of King Arthur, where the spaceman is able to change the course of history.

Plot Synopsis: A spaceship has been designed to test the Theory of Relativity by travelling faster than the speed of light. It uses intense magnetic fields to “collect atoms while in flight, ionising them ahead of the craft and guiding the ions into the intake area.” Trimble is sent to the cockpit of the spacecraft just before take off to sort out a last-minute technical problem, but a bolt of lightning strikes, which causes the ship to launch prematurely with only him inside it. He tries to override the computers and stabilise the ship in an orbit around the earth, so he can then land the ship. He sees the sun rising and setting on the earth in fast motion, as he races back through time. He finally lands to find the year is 508 and he is in England during the time of King Arthur. During his adventure, he manages to change the course of history, before taking off again. He tells Alisande, the girl he has fallen in love with that she cannot come with him because he is not sure if she will prematurely age as they go forward in time. He goes back into orbit and travels at a speed that causes the clocks to move forward very quickly. After travelling more than one hundred years into the future, he notices that a goose has stowed away, but has not aged at all, so he decides to go back for her.

Genre: Science Fiction – Time Travel Vehicle.

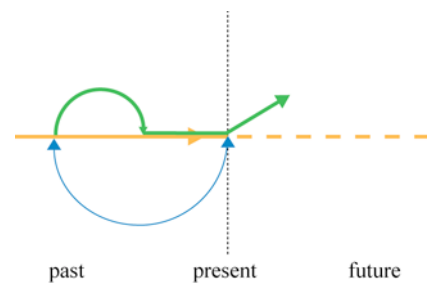
My Comments: The idea is of course pure fantasy, as a rocket is not able to accelerate to a speed faster than light, as its mass will keep increasing, causing it to need more and more energy to keep going faster.

Time Travel Summary: We will never know what consequences Trimble caused in his present by changing the course of history because the movie finishes before he reaches home. However it infers there will be none because the timeline will have converged by the time he arrives home. However, his future will be open as he will be arriving with his newfound love.

Model of Time:

Open past, open future

Converging timeline



***Sphere* (1998)**

Director: Barry Levinson.

078

Writing Credits: Michael Crichton (novel), Kurt Wimmer (adaptation).

Production Companies: Baltimore Pictures, Constant c Productions, Punch Productions.

Distribution: Warner Bros. Pictures.

Actors: Dustin Hoffman (Dr. Norman Goodman), Sharon Stone (Dr. Elizabeth 'Beth' Halperin), Samuel L. Jackson (Dr. Harry Adams), Liev Schreiber (Dr Ted Fielding).

Runtime: 134 minutes.

The Internet Movie Database User Rating: 5.5/10 25,006 votes

Overview: Four scientists discover a spaceship from the future, 1000 feet below the ocean that had crash-landed there about 300 years ago. It had travelled back in time by inadvertently flying into a black hole.

Plot Synopsis: An unknown spaceship is found at the bottom of the ocean. It appears to have crash-landed there about 300 years ago. When scientists enter, they notice it is American and begin to wonder, not where it is from, but when. They surmise that it had travelled into a black hole and arrived here from the future. Later Harry reflects about time travel, "When we get back, we're going to tell everyone how it's possible, how it's done, what the dangers are. But why, when 50 years in the future, when this spacecraft encounters a black hole, does the computer call it an unknown entity event. Why do not they know? If they do not know, that means we never told anyone. If we never told anyone, it means we never made it back; hence, we die down here. Just as a matter of deductive logic." Only three of them survive and make it back to the surface, but they decide not to tell anyone that the craft was from the future and that time travel is indeed possible, as they fear that then the timeline would not be self-consistent.

Genre: Science Fiction - Finding Portals.

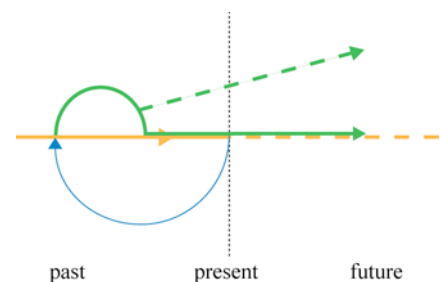
My Comments: A conversation in the film: Ted, the physicist, asks, “What if this craft inadvertently flew into a black hole? It arrived in our past from its present.” Harry explains to Norman that “a black hole is a collapsed dead star that has so much gravity that it acts like a huge vacuum cleaner sucking everything into it: light, interstellar dust, time...” Norman asks, “Time?” Harry replies, “It is possible, but not plausible!” Then Ted interrupts, “It is more than probable – it is rudimentary astrophysics, we just have not been able to fly into one to prove it.”

Time Travel Summary: The unknown spaceship accidentally goes back in time and its discovery changes history, so the past is open. However, as the surviving crew decide not to tell anyone, the timeline converges, so that the future is not changed. This means the spaceship will still have the accident and the timeline will remain self-consistent. The survivors thought that if they did tell someone what had happened, they would cause the timeline to diverge, which means that the model of time used in this film had a double-well timeline.

Model of Time:

Open past, open future

Double-well timeline



Star Trek IV: The Voyage Home (1986)

Director: Leonard Nimoy.

079

Writing Credits: Gene Roddenberry (TV), Leonard Nimoy (story).

Production Company: Paramount Pictures.

Distributor: Paramount Pictures.

Actors: William Shatnerv (Admiral / Captain James T. Kirk), Leonard Nimoy (Captain Spock), DeForest Kelley (Dr. Leonard "Bones" McCoy), James Doohan (Commander Montgomery "Scotty" Scott).

Runtime: 119 minutes.

The Internet Movie Database User Rating: 7.3/10 20,543 votes

Overview: The Enterprise uses the sling shot method around the sun to go back to the 20th century to capture a pair of whales to take back to their time because whales are extinct in their time and they need them to save their world.

Plot Synopsis: Captain Kirk and his crew used the sling shot method around the sun to go back in time to our present time, (just as they had done in one of the original episodes of Star Trek). This time, however, they were not so careful about altering the past, as they taught a plastics manufacturer about a new stronger substance that had not been invented yet, reasoning that he would have discovered it soon enough any way. On leaving, they took a marine biologist with them and they also succeeded in their mission, which was to capture a pair of humpback whales that they needed to save the planet Earth in their own century. They used the sling shot method again and on returning to Earth, found that their actions in the past had caused no significant changes.

Genre: Science Fiction – Time Travel Vehicle.

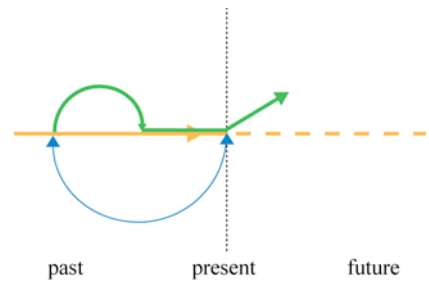
My Comments: In reality, the sling shot method will not cause them to travel back and forwards through time.

Time Travel Summary: Unlike previous Star Trek adventures into the past, where the crew were very careful not to change anything that might be significant enough to cause the timeline to diverge, this time they seemed confident that the timeline would converge whatever they did. So the past is open and the future is also open as they were able to use the whales to save the planet Earth.

Model of Time:

Open past, open future

Converging timeline



Star Trek: First Contact (1996)

Director: Jonathan Frakes.

080

Writing Credits: Gene Roddenberry (TV), Rick Berman (story).

Production Companies: Paramount Pictures.

Distribution: Paramount Pictures.

Actors: Patrick Stewart (Captain Jean-Luc Picard), Jonathan Frakes (Commander William Riker), Brent Spiner (Lt. Commander Data (LeVar Burton (Lt. Commander Geordi La Forge (as LeVar Burton) (Michael Dorn (Lt. Commander Worf).

Runtime: 111 minutes.

The Internet Movie Database User Rating: 7.6/10 37,983 votes

Overview: Two spacecrafts enter a time distortion and end up in the mid-21st century, where the Borg are trying to stop humans from completing their first super-luminal travel, so they can change history in their favour.

Plot Synopsis: In the 24th century, Capt. Picard of the Enterprise chases a small Borg pod towards the Earth that is escaping from a giant Borg Cube that has lost a battle. The Borg creates a time distortion to take the pod back to the mid-21st century - the time when humans were about to make their first sub-luminal travel. If the Borg can stop this, they can change history. The Enterprise chases the pod through the temporary time distortion. The Borg try to take over the Enterprise in order to communicate to their race on a distant planet that now would be the best time to invade Earth. Capt. Picard saves the day by making sure that history is restored and then returns to the 24th Century without the past having been changed too much.

Genre: Science Fiction - Creating Wormholes.

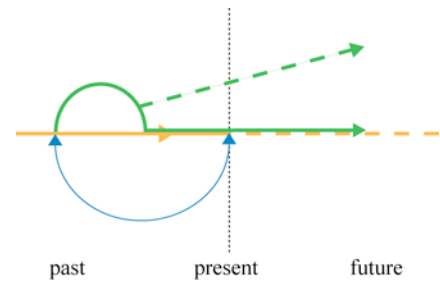
My Comments: The plot is similar to *Back to the Future* (1985) and more in line with the model of time used in the original TV series: the past is changed and the timeline needs restoring, so that it can converge to the original present.

Time Travel Summary: The inference is that if enough changes are allowed to remain in the past, and not corrected that the timeline will not converge back, but will diverge off to a new future.

Model of Time:

Open past, open future

Double-well timeline



Star Trek: Generations (1994)

Director: David Carson.

081

Writing Credits: Gene Roddenberry (TV), Rick Berman (story).

Production Companies: Paramount Pictures.

Distribution: Paramount Pictures.

Actors: Patrick Stewart (Captain Jean-Luc Picard), William Shatner (Captain James T. Kirk), Jonathan Frakes (Commander William T. Riker).

Runtime: 118 minutes.

The Internet Movie Database User Rating: 6.4/10 21,422 votes

Overview: Capt. Picard enters the Nexus, a place where time does not exist, a paradise where everything you want exists, but nothing is real. He meets Capt. Kirk, who was trapped in there 78 years ago.

Plot Synopsis: The Nexus is a place where time does not exist, a paradise where everything you want exists, but nothing is real. Those who enter never want to leave this perfect world. A rogue scientist, Soren wishes to enter this place and decides to launch a probe into the centre of a sun with a tri-lithium compound which will cause the sun's reactor to halt, hence causing a ripple across space-time which will enable him to enter the Nexus when it passes his planet. Capt. Picard of the Starship Enterprise-D, tries and fails to stop Soren from launching the probe, and they both end up in the Nexus, where Picard meets Capt. Kirk who got caught in there 78 years ago. As time does not exist on Nexus, if the inhabitants wish to leave, they can choose when to re-enter the timeline of our universe. So Picard and Kirk choose to leave and re-enter the timeline to stop Soren just before he launches the probe. This time Picard is successful, but Kirk dies in the fight. Picard returns to his ship and the solar system is saved.

Genre: Science Fiction - Finding Portals.

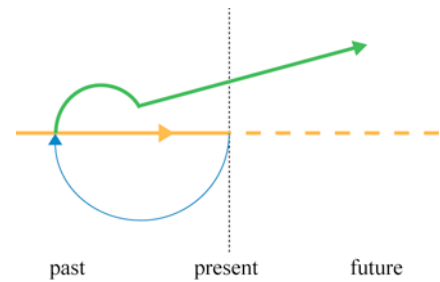
My Comments: The Nexus is a part of space that is timeless and can therefore be used as a plot device for characters from different times to co-exist together. Because it exists out of time, it can also be used as a stepping-stone to move onto any region of the timeline and change it for the better.

Time Travel Summary: Arriving on the timeline is not enough to cause it to diverge. In order for them to change the timeline, they have to kill Soren to prevent him from launching the probe, which suggests a double-well timeline.

Model of Time:

Open past, open future

Double-well timeline



***Stargate: Continuum* (2008)**

Director: Martin Wood.

082

Writing Credits: Brad Wright, Jonathan Glassner.

Production Companies: Metro-Goldwyn-Mayer (MGM), Acme Shark, Kawoosh!

Productions DTV II.

Distribution: Metro-Goldwyn-Mayer (MGM).

Actors: Ben Browder (Colonel Cameron Mitchell/Captain of the Achilles), Amanda Tapping (Colonel Samantha Carter), Christopher Judge (Teal'c), Michael Shanks (Dr. Daniel Jackson), Claudia Black (Vala Mal Doran/Quetesh), Cliff Simon (Ba'al).

Runtime: 98 minutes.

The Internet Movie Database User Rating: 7.4/10

4,068 votes

Overview: Ba'al goes back in time and prevents the Stargate Program from being formed. Three members of SG-1 are travelling through a wormhole when the timeline is changed, so when they exit it, they are on the new diverging timeline.

Plot Synopsis: The evil Ba'al travels from the present back to 1939 to prevent a ship called the *Achilles* from transporting a Stargate to the United States. This changes the course of history such that the Stargate Program was never formed. In the present, so that when they exit the wormhole, they find themselves on Earth, but on a diverging timeline with a different present. They ask the U.S. government to let them recover the sunken Stargate and change the timeline back, but are denied, as millions of people on the current timeline would cease to exist. A year later, Ba'al arrives with a fleet to take over the Earth. The president now gives SG-1 permission to use the sunken Stargate. SG-1 manages to activate it and use it to jump across the universe to Ba'al's time machine. They set it up to transport themselves back to 1929, so they can be ready and waiting for Ba'al when he arrives in 1939. However, Ba'al's queen arrives with her troops and a battle follows in which they are all killed except Mitchell, who escapes using the time machine, before it is destroyed. He arrives in 1929 and then ten years later, kills Ba'al and his troops as they arrive through the Stargate on the *Achilles*. We return to the present, where the timeline has been restored except for an old photo in Mitchell's locker, which shows him standing next to his grandfather on the *Achilles* in 1939.

Genre: Science Fiction – Creating Wormholes.

386

My Comments:

Ba'al travels back and makes significant changes, then returns to his own time, just like Biff did in *Back to the Future Part II* (1989). When their timeline collapses, the three SG-1 team members are in transit in a wormhole, just as Marty and the Doc were in transit in their time machine. This storyline therefore suffers from similar paradoxes as those discussed in the review of *Back to the Future Part II* (1989).

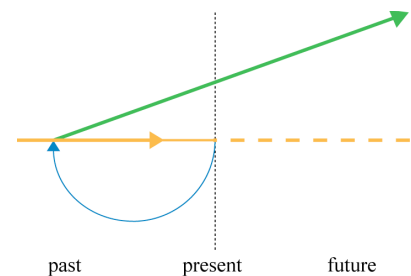
Time Travel Summary:

Ba'al goes back in time and causes the timeline to diverge to a future, which is more favourable for him. In doing so, he changes both the past and the future, which must therefore both be open.

Model of Time:

Open past, open future

Diverging timeline



Suddenly 30 (1995)

aka *'13 Going on 30'*

Director: Gary Winick.

083

Writing Credits: Josh Goldsmith, Cathy Yuspa.

Production Companies: Revolution Studios, Thirteen Productions LLC.

Distribution: Sony Pictures Entertainment.

Actors: Jennifer Garner, Mark Ruffalo, Judy Greer, Andy Serkis.

Runtime: 98 minutes.

The Internet Movie Database User Rating: 6.1/10 24,880 votes

Overview: Some wishing dust falls off a dollhouse onto a teenage girl's head and she wakes up to find she has time-travelled 17 years into the future, so she has the mind of a 13-year-old, but the body of a 30-year-old.

Plot Synopsis: Jenna Rink has just become a teenager, but wishes she were “thirty, flirty and thriving.” She is repeating the mantra over and over when some wishing dust falls off a dollhouse onto her head. She wakes up to find she has time-travelled 17 years into the future and now she has the mind of a 13-year-old, but the body of a 30-year-old. She is a good-looking, single and a successful magazine editor. However she does not like the person she has become and regrets that she pushed away Matt, her best friend at school because he was considered uncool. The same wishing dust is still on the dollhouse when she finds it again and a wind blows some of it onto her, sending her back to her 13th birthday party. She changes the decisions she made at that time, and we fast forward to her marrying Matt. This is a feel-good movie. One of those movies that makes us believe that we can rid ourselves of regret by going back and changing things for the better.

Genre: Fantasy – Magic.

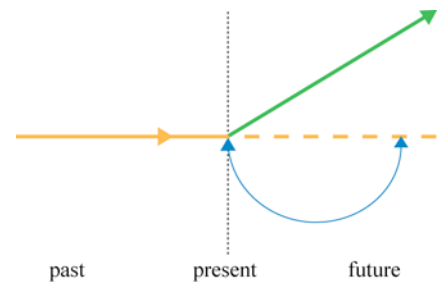
My Comments: Jenna travels to her future and then travels back in time to make changes to her childhood. The film then fast-forwards along the new timeline where we discover that she has created a better future for herself.

Time Travel Summary: Jenna never goes back in time before her present, so the past is unchanged. After a return trip to her future, she makes changes to her present, which cause her destiny to change, so the future is also open and the timeline diverging.

Model of Time:

Undefined past, open future

Diverging timeline



Superman (1978)

Director: Richard Donner.

084

Writing Credits: Jerry Siegel, Joe Schuster.

Production Companies: Alexander Salkind, Dovemead Films, Film Export A.G.,
International Film Production.

Distribution: Warner Bros. Pictures.

Actors: Christopher Reeve (Superman/Clark Kent), Margot Kidder (Lois Lane),
Marlon Brando (Jor-El), Gene Hackman (Lex Luthor).

Runtime: 143 minutes.

The Internet Movie Database User Rating: 7.3/10 40,878 votes

Overview: As Superman speeds to the Earth, time dilates and he travels forwards in time. At the end of the film, he reverses the Earth's spin, which causes time to rewind, so he can go back in time and save the lives of people, who had previously died.

Plot Synopsis: In order to preserve his race, the alien, Jor-El, sends his baby son in a space pod away from Planet Krypton, as it is doomed to spiral into its sun. Several years later, it arrives on Earth and the baby is now a young boy. In the meantime, thousands of years have passed on Krypton, which has now been destroyed by its sun. He becomes Clark Kent and is raised on a farm, before travelling to Metropolis, where he finds work as a newspaper reporter. His super-human strength and powers earn him the nickname Superman. When his girlfriend, Lois Lane, dies in an accident, he decides to use his powers to turn back time. He flies many times around the earth faster than the speed of light; the Earth slows to a standstill and then begins spinning in the opposite direction, so the clocks on Earth turn backwards. By the time he lands back on Earth, Lois is now alive and he is able to prevent her death and save the Earth from destruction.

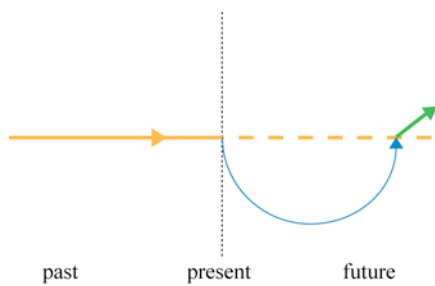
Genre: Science Fiction – Time Travel Vehicle and Time Reversal.

My Comments: Superman’s pod travels at high speeds for several years causing time to dilate, so that he has travelled thousands of years into the future by the time he arrives on the Earth. This does not break any of the laws of physics, unlike the time travel at the end of the film because causing the Earth to rotate in the opposite direction cannot reverse time.

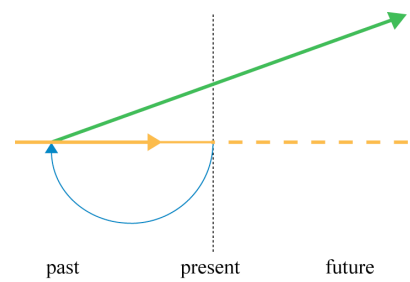
Time Travel Summary: On the original timeline, Lois died, so Superman goes back and changes the past by saving her life. Therefore, he has created a new diverging timeline, which replaced the previous one.

Model of Time: Open past, open future with a diverging timeline.

Superman travels forwards in time:



Superman turns back time:



Teenage Mutant Ninja Turtles III (1993)

Director: Stuart Gillard.

085

Writing Credits: Kevin Eastman, Peter Laird (characters).

Production Companies: Clearwater Holdings, Golden Harvest Company.

Distribution: New Line Cinema.

Actors: Mark Caso (Leonardo), Matt Hill (Raphael), Jim Raposa (Donatello), David Fraser (Michaelangelo), Elias Koteas (Casey Jones/Whit), Paige Turco (April O'Neil), Henry Hayashi (Kenshin), Stuart Wilson (Walker), Sab Shimono (Lord Norinaga).

Runtime: 96 minutes.

The Internet Movie Database User Rating: 4.2/10 6,900 votes

Overview: A woman in NYC and a warrior from ancient Japan are both holding identical sceptres, when one of them reads the inscription on its handle. It's magic powers are activated and they trade places.

Plot Synopsis: In modern day New York, April brings an ancient Japanese sceptre that she has found to the turtles. Meanwhile, in feudal Japan circa 1609, Kenshin finds an identical sceptre and reads the inscription on its handle, "Open wide the gates of time". It's magic powers are activated and a bulb inside the handle begins to rotate and emit electrical sparks. April and Kenshin trade places in both space and time, this causes them to exchange clothes during the transfer. The four turtles soon realise what has happened and they decide to travel back in time to save April. According to Donatello's calculations, the exchange only works if bodies of equal mass are displaced. So they swap places in time with four Honour Guards from Japan. He also calculates they only have 60 hours left to save April and return before the gates of time close. During their Japanese adventure, they prevent a war. Back in New York, Kenshin is anxious to return home and activates the sceptre. The four Honour Guards rush back and huddle around their sceptre with Kenshin. In Japan, the turtles gather around theirs with April, but Michaelangelo is too slow and does not make it in time. So one Honour Guard does not get exchanged and runs off with the sceptre, but it activates again and he and Michelangelo finally exchange places. The head of the sceptre is damaged, thus closing the gates of time forever.

Genre: Fantasy – Ancient Artefact.

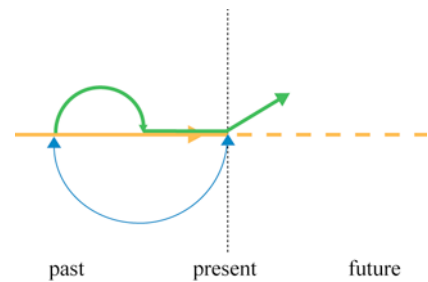
My Comments: Not all of the turtles wanted to go home, but decided they should, so as not to interfere with history, but had not they just prevented a war that would have taken place if it were not for their presence in Japan?

Time Travel Summary: When April and the turtles returned from the past, everything was just as it was before they left. Even though they had prevented a war, it seems the timeline had still converged. As they had learned from their experiences in the past, they had returned as different people, so it is inferred that they would be able to make better choices in their future, which would mean that the future was open.

Model of Time:

Open past, open future

Converging timeline



The Terminator (1984)

Director: James Cameron.

086

Writing Credits: James Cameron, Gale Anne Hurd.

Production Companies: Hemdale Film, Cinema 84, Euro Film Funding, Pacific Western.

Distributor: Orion Pictures Corporation.

Actors: Arnold Schwarzenegger (The Terminator), Linda Hamilton (Sarah Connor), Michael Biehn (Kyle Reese).

Runtime: 108 minutes.

The Internet Movie Database User Rating: 8.1/10 132,863 votes

Overview: A terminator robot is sent from the year 2029 to the mother of John Connor, the future leader of the human resistance. John sends a fellow freedom fighter back from the future to protect his young mother and ensure his birth.

Plot Synopsis: In the year 2029, the human resistance led by John Connor had just won a war against an army of self-aware machines. Freedom fighter, Kyle Reese, finds that Skynet, the machine's computerised defence system, has just sent a Terminator robot back in time to kill John's mother before he is conceived. (A Terminator is a cybernetic organism: living tissue over a metal endoskeleton.) John then sends Kyle back in time to stop the Terminator. They must travel naked, "something about the field generated by a living organism, nothing dead will go," which is why they both arrive unarmed. The time machine is destroyed, so neither one of them can get back, nor can anyone else can follow them through. Kyle finds Sarah Connor first and saves her from the Terminator. He gives her a message that John made him memorise: "Thank you Sarah for your courage through the dark years. I cannot help you with what you must soon face, except to say that the future is not set. You must be stronger than you imagine you can be. You must survive, or I will never exist." Kyle finally defeats the terminator and ends up getting Sarah pregnant, thus becoming the father of John. The movie ends with Sarah recording an audiotape for her unborn son. She says, "Should I tell you about your father? That's a tough one. Will it affect your decision to send him here, knowing that he is your father? If you do not send Kyle, you can never be ... God a person can go crazy thinking about this."

Genre: Science Fiction - Transporting Body Through Time.

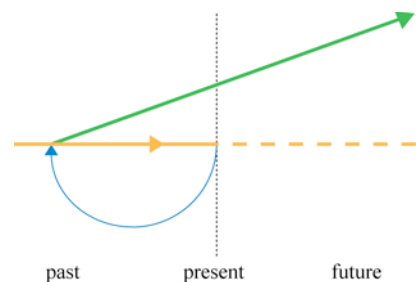
My Comments: If Kyle had not gone back in time, then he would never have got Sarah pregnant and John would not have been born. This sets up a closed causal loop in time causing what is known as the predestination paradox. Sarah may well have got pregnant to another guy later, but would not have given birth to John, the son of freedom fighter, Kyle. According to John, the future is not set. As they can send people back in time, the past is not set either - unless of course they were meant to come back in time. That would mean that the causal loop was part of the original timeline. So the paradox is that Skynet caused its own downfall by creating the time displacement equipment that allowed Kyle to pass through and impregnate Sarah. Also, the Skynet project starts because of the components found belonging to the original Terminator, which the machines send back through time. This causes another paradox because without the Skynet sending the Terminator back through time, the humans would probably never have got the components they needed to invent Skynet.

Time Travel Summary: The Terminator and Kyle go back in time and the changes that they appear to make were what caused destiny to unfold. They therefore had to come back in time and be part of what appeared to be a fixed past. However, Kyle passes on a message from John to Sarah saying that the future is not set. Maybe this message was given to her to encourage her, rather than a truthful statement. The model of time is taken as being what the characters believe and it seems they all believe the future and past to be open with a diverging timeline, even though there are causal loops.

Model of Time:

Open past, open future

Diverging timeline with a causal loop



Terminator 2: Judgement Day (1991)

Director: James Cameron.

087

Writing Credits: James Cameron, William Wisher Jr.

Production Companies: Canal+, Carolco Pictures, Lightstorm Entertainment, Pacific Western, T2 Productions.

Distributor: TriStar Pictures.

Actors: Arnold Schwarzenegger (The Terminator), Linda Hamilton (Sarah Connor), Edward Furlong (John Connor), Robert Patrick (The T-1000 Terminator).

Runtime: 152 minutes (director's cut).

The Internet Movie Database User Rating: 8.4/10 176,397 votes

Overview: Two robots are sent back from the future: one by the machines to kill a boy called John Connor, who will become leader of the human resistance. The other is sent by John to protect his younger self and his mother.

Plot Synopsis: John Connor captures a Terminator robot, reprograms it and sends it back through time on a mission to protect his younger self. Another cybernetic organism soon follows, a T-1000 advanced prototype made from liquid metal, whose mission is to kill the young John. The first Terminator helps John to escape from the T1000. Meanwhile, Sarah Connor is being held as a patient in a hospital for the criminally insane. In her dreams, she is constantly meeting her dead lover, Kyle, who tells her that John is in danger and reminds her of his message from before, "The future is not set, there is no fate, but what we make for ourselves." John and the Terminator help his mother to escape from the hospital. The terminator tells them that a man called Dyson was the creator of Skynet. They figure if they can stop him, they can stop 'Judgment Day': the day when Skynet launches the nuclear missiles that destroy most of the human population. They find Dyson and with his help, go to the factory that was going to create the self-aware machines. On the way to the factory, Sarah narrates the following, "The future, so clear to me, had become like a black highway at night. We were in uncharted territory now, making up history as we went along." They destroy the factory and the remains of the first Terminator, which was kept there. The surviving Terminator allows them to terminate him to remove all evidence that might allow that possible future to be regenerated.

Genre: Science Fiction - Transporting Body Through Time.

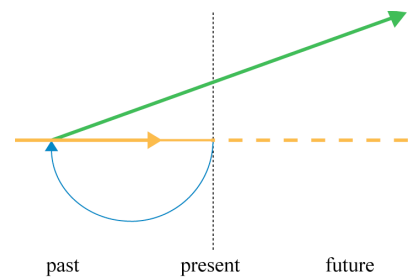
My Comments: John and Sarah believe the changes they are making are recreating the timeline's future as they go. What is really happening with the timeline will be revealed 12 years later in the next film of the series, *Terminator 3: Rise of the Machines* (2003). However, the timeline of this film is what they believe it to be.

Time Travel Summary: The changes John and Sarah are making are creating a new future, which is replacing the old one. There is no proof that this is happening, but this is what they all believe, so the model of time used has an open past and future with a timeline that diverges.

Model of Time:

Open past, open future

Diverging timeline



Terminator 3: Rise of the Machines (2003)

Director: Jonathan Mostow.

088

Writing Credits: John D. Brancato (story & screenplay).

Production Company: C-2 Pictures, Intermedia Films, IMF Internationale Medien und Film GmbH & Co. 3. Produktions KG, Mostow/Lieberman Productions.

Distributor: Warner Bros. Pictures.

Actors: Arnold Schwarzenegger (Terminator), Nick Stahl (John Connor), Claire Danes (Kate Brewster), Kristanna Loken (T-X).

Runtime: 109 minutes.

The Internet Movie Database User Rating: 6.7/10

79,870 votes

Overview: A more advanced terminator comes back from the future to kill the young people who will become lieutenants of the human resistance. They, in turn, send back a re-programmed terminator, as before, to oppose it.

Plot Synopsis: This movie begins with John Connor quoting his mother, Sarah, from the previous Terminator film, "The future has not been written. There is no fate but what we make for ourselves." He says, "I wish I could believe that." An extremely advanced terminator (TX) comes back from the future to kill the young people who will become John Connor's lieutenants when he is leader of the human resistance. They, in turn, send back a re-programmed terminator, as before, to oppose it. John tells the terminator that he should not even exist, as he had stopped Judgment Day (the beginning of a war between man and machines), but the terminator tells him, "You only postponed it, Judgement Day is inevitable." They visit Sarah's coffin and find it full of arms that John could access just in case the robots came back. John realises that she did not fully believe her conviction either. He finds out more about his future and how he will die, but then gives up the idea of a predestined future, and sets off in a plane with Kate to blow up the supercomputers that he believes control Skynet. He tells her, "We are going to make it Kate - the future is up to us." At the end of the film, after John has failed in his mission to destroy Skynet, a voiceover from him explains, "I should have realised our destiny was never to stop Judgement Day - it was merely to survive it together. The Terminator knew, he tried to tell us, but I did not want to hear it. Maybe the future has been written, I do not know."

Genre: Science Fiction - Transporting Body Through Time.

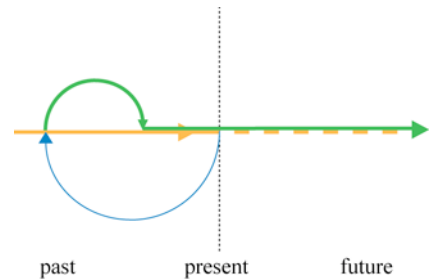
My Comments: On the eve of the inevitable Judgment Day, destiny is uncovered: nothing can stop the machines from rising, but eventually the resistance will be led to victory by John, who will then be killed by a terminator. Unlike the other Terminator films, we do not have a sense that the characters are creating a future, which makes the film rather pedestrian. Having a plot with a pre-destined future that the audience knows, removes too much suspense from the movie. Novikov's self-consistency conjecture is in play here: no matter how much they try to change the future, something always conspires to stop them so that destiny is unchanged in order to keep a self-consistent universe.

Time Travel Summary: The robots and humans keep changing the past, but whatever they do, the timeline always converges back before the time travel begins, which keeps the storyline self-consistent. After that point, we have to assume the future is fixed, as the Terminator even knows how John will die.

Model of Time:

Open past, closed future

Converging timeline



Time After Time (1979)

Director: Nicholas Meyer.

089

Writing Credits: Karl Alexander (novel), Steve Hayes (story)

Production Company: Orion Pictures Corporation, Warner Bros. Pictures.

Distributor: Warner Bros. Pictures.

Actors: Malcolm McDowell (H. G. Wells), David Warner (Jack the Ripper - John Leslie Stevenson), Mary Steenburgen (Amy Robbins).

Runtime: 112 minutes.

The Internet Movie Database User Rating: 7.2/10 4,193 votes

Overview: Jack the Ripper uses H.G. Well's time machine to escape the law and ends up in San Francisco in 1979. The machine returns back to 1893, where H.G. decides to pursue Jack through time.

Plot Synopsis: H.G. Wells shows off his new time machine to some colleagues and then discovers that one of them is actually Jack the Ripper. He explains to his friends how it works: "The cruising speed is two years per minute. You can go into the past, or the future at will ... Acceleration will keep the machine and its occupant outside of all time spheres in a conscious, but vaporised state." The machine has some safety functions: "The reversal rotation lock automatically returns the machine to its starting date after the completion of a voyage. Also, if the occupant is injured during the course of a flight, the passenger is returned to the point of departure unless he uses this key to contermmand the device. Finally, the 'vaporising equaliser': without it, the passenger journeys through time without the machine and without the machine, there is no coming back." Jack uses the time machine to escape the law and arrives in San Francisco in 1979. As he does not have a key, the time machine returns to H.G.'s London basement back in 1893. H.G. then goes after Jack in the time machine. While searching for him around San Francisco, he falls in love with Amy, a bank clerk, who helps him adjust to life in the 70's. When Jack is cornered, he tries to escape again using the time machine, but H.G. has removed the machine's equalising vaporiser, so the machine sends him "to where he belongs: infinity." H.G. then returns in his machine to 1893, bringing Amy back with him. He concludes, "Every age is the same, it is only love that makes any of them bearable."

Genre: Science Fiction – Time Travel Vehicle.

400

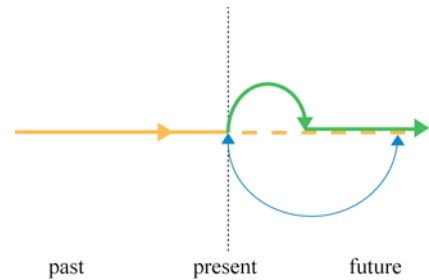
My Comments: Note that this time machine, unlike the one used in the original book and film travels not just through time, but also through space, i.e. from London to San Francisco. Rather than being a feature of the manipulation of time, I feel this was just a plot device that was used so the action could take place in the United States.

Time Travel Summary: H.G. Wells travels to his future and makes changes, so from his perspective the future seems to be open. He and Amy then both travel back to his present, where they stay and marry. Neither of them goes back in time any further than the starting point of the initial time travel, therefore his past is undefined. The problem with this model of time is that the type of timeline is totally unknown, as nobody travels forward again to find out the consequences of Amy staying and marrying H.G. If the timeline were to diverge, this would create a paradox, as she would have come from a future that no longer existed. Therefore, we have to assume that the new timeline converged back again, so that it could remain self-consistent.

Model of Time:

Undefined past, open future

Converging timeline



Time Bandits (1989)

Director: Terry Gilliam.

090

Writing Credits: Michael Palin, Terry Gilliam.

Production Companies: HandMade Films.

Distribution: AVCO Embassy Pictures.

Actors: Craig Warnock (Kevin), David Rappaport (Randall), Kenny Baker (Fidgit), Malcom Dixon (Strutter), Mike Edmonds (Og), Jack Purvis (Wally), Tiny Ross (Vermin), David Warner (Evil), Ralph Richardson (The Supreme Being).

Runtime: 116 minutes.

The Internet Movie Database User Rating: 6.9/10 18,339 votes

Overview: A group of dwarves steal an ancient scroll, which shows a map of time portals and when they open and close. They plot their path through time in and out of these portals stealing gold and jewellery as they go.

Plot Synopsis: A group of dwarves steal an ancient scroll from the Supreme Being, which shows a map of time portals and when they open and close. Evil tries to catch the dwarves, so that he can possess the map and use it for his own purposes. The dwarves plot their path through time in and out of these portals stealing gold and jewellery as they go. They befriend a young boy on their travels who continues on their travels with them. They end up getting caught by Evil, who gets the map. The Supreme Being eventually arrives to destroy Evil, reclaim his map and set everyone else free. He claims Evil was quite an effective creation of his.

Genre: Fantasy – Finding Portals.

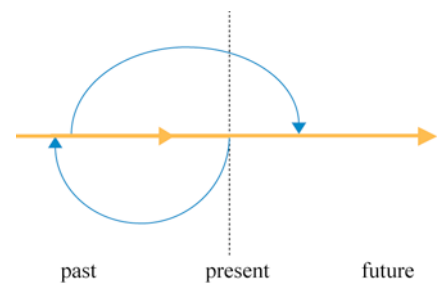
My Comments:

Time Travel Summary: There seems to be no consequence of the dwarves going in and out of the portals making changes to both the past and the future. This suggests that each time they go through a portal, the timeline converges soon after. Another explanation could be that the timeline was fixed and that each supposed change they made to the timeline was meant to happen, as it caused the future to turn out the way it did. The fact that the Supreme Being coolly appeared at the end gave a hint that everything that had happened up to that point was predestined.

Model of Time:

Closed past, closed future

Fixed timeline with causal loops



Time Changer (2002)

Director: Rich Christiano.

091

Writing Credits: Rich Christiano.

Production Companies: 8X Entertainment Inc., Christiano Film Group, Five & Two Pictures.

Distribution: 8X Entertainment Inc.

Actors: D. David Morin (Russell Carlisle), Gavin MacLeod (Norris Anderson), Hal Linden (The Dean), Jennifer O'Neill (Michelle Bain).

Runtime: 95 minutes.

The Internet Movie Database User Rating: 4.9/10 765 votes

Overview: Dr Norris Anderson travels forwards in time to our present and what he sees convinces him that the world is on a path to ruin and will soon end. He returns to 1890 convinced that changes must be invoked to prevent this from happening.

Plot Synopsis: Dr Norris Anderson's father invented a time machine just before he died. In 1890 Norris uses it to take a return trip to the early 21st century and is shocked by how Christian values have declined in modern America. Bible Professor, Russell Carlisle is about to publish a book called *The Changing Times*, but first he needs the unanimous endorsement of the board members of the Grace Bible Seminary. Norris refuses to endorse it until Russell time travels to the future to "see where the teaching of good morals alone will lead." He says, "You must see for yourself what happens when we remove the authority of Christ out of life." He tells him that the machine will not allow the user to bring back any object from the future because the article would not have existed yet. He also tells him that he has yet to calculate a way to transport two travellers simultaneously, so Russell must go alone. He turns on the machine and Russell arrives in the future at noon on a Saturday and then departs the following Wednesday at 9pm. However when he arrives back in his own time, only a few seconds have passed. Russell tells Norris that he believed he was witnessing the last days. Russell re-edits his book and changes the title to *Time Changer* because he says, "Times must change, or time as we know it will end." The movie finishes with Norris trying, but unable to send an object with his time machine to a future date way past 2002, which is evidence enough for him that the world has ended.

Genre: Science Fiction - Transporting Body Through Time.

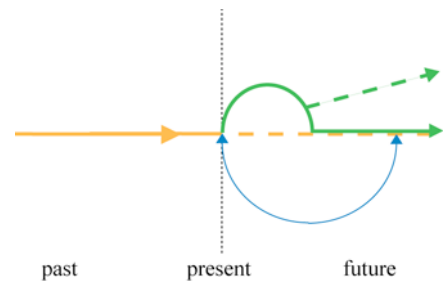
My Comments: A Christian time travel movie designed to show that the teaching of good morals alone leads to the decline of Christian values in the United States.

Time Travel Summary: Norris believed that changing actions in his present could prevent the future he had foreseen; therefore, he assumed the future was open. His experiment at the end of the film shows that small changes will not be enough to make a difference because it seems the timeline had converged and the world had still ended. So he learned that changes may not be lasting unless they are significant enough to cause the timeline to diverge permanently, which is consistent with a double-well timeline.

Model of Time:

Undefined past, open future

Double-well timeline



The Time Guardian (1987)

Director: Brian Hannant.

092

Writing Credits: John Baxter, Brian Hannant.

Production Companies: Chateau, FGH, Hemdale Film, International Film Management.

Distributor: Hemdale Film.

Actors: Tom Burlinson (Ballard, The Time Guardian), Nikki Coghill (Annie Lassiter), Dean Stockwell (Boss), Carrie Fisher (Petra).

Runtime: 87 minutes.

The Internet Movie Database User Rating: 3.8/10 177 votes

Overview: To escape the attack by an army of cyborgs, a city in the 41st century is transported through space and time to outback South Australia in our time. Two of its inhabitants are sent ahead to prepare the location.

Plot Synopsis: In the 41st century, a city protected by a dome of energy is about to be transported through space and time to present-day outback South Australia to escape an attack by an army of cyborgs (part human, part machine). Two of its inhabitants are sent ahead to prepare the location: The Time Guardian, who is called Ballard, and Petra, his assistant. A local girl, Annie agrees to help them, and the city arrives safely. However, so do the cyborgs and a big showdown it ensues. The humans win, and the domed city leaves for the future. Annie decides to go with them to be with Ballard, her newfound love.

Genre: Science Fiction – Time Travel Vehicle.

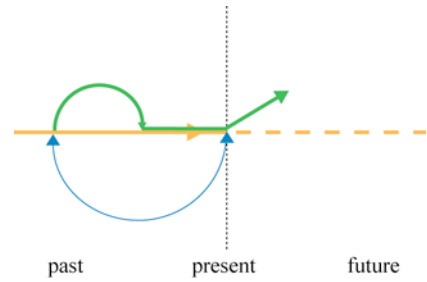
My Comments: We never get to see the consequences of the city making a return trip back in time because the story finishes before they arrive back in their own time.

Time Travel Summary: The city had been moving freely backwards and forwards through time without it affecting the timeline, so it seems the timeline always converges back before they return to their own time.

Model of Time:

Open past, open future

Converging timeline



The Time Machine (1960)

Director: George Pal.

093

Writing Credits: H.G. Wells (novel), David Duncan (screenplay).

Production Company: George Pal Productions, Galaxy Films Inc., Metro-Goldwyn-Mayer (MGM).

Distributor: Metro-Goldwyn-Mayer (MGM).

Actors: Rod Taylor

Rod Taylor (H. George Wells), Alan Young (David Filby/James Filby), Yvette Mimieux (Weena).

Runtime: 103 minutes.

The Internet Movie Database User Rating: 7.6/10

8,652 votes

Overview: In 1899, George builds a time machine and travels to 802,701 A.D. to a primitive land inhabited by the Eloi. He falls in love, but decides to leave her to travel back home to tell his colleagues that his time machine works.

Plot Synopsis: In 1899, George builds a time machine and invites some learned colleagues over for dinner to explain to them how it works: “The difficulty in explaining a fourth dimension is that it cannot be seen or felt... [but it] is as real and as true as the other three ... in fact they could not exist without it. ... Why is it that we usually ignore the fourth dimension? Because we have no freedom of movement within it. We can move within the other three: up-down, forwards-backwards, sideways ... but when it comes to time, we are prisoners.” He explains more, “The larger model of the time machine can be used to carry a passenger on a journey through time – not through space mind you – but through time ... the future is already there; it is irrevocable and cannot be changed.” George says, “I wonder. That is the most important question to which I hope to find the answer. Can man control his destiny? Can you change the shape of things to come?” He agrees to meet them again in a week and travels into the near future, then continues on and visits several world wars until he lands in 802,701 A.D. He finds a primitive land inhabited by the Eloi where he falls in love with Weena, a female Eloi. He decides to leave her to travel back to tell his colleagues that his time machine works. However, they are not convinced, so he takes off again into the future to be with his Eloi lover.

Genre: Science Fiction – Time Travel Vehicle.

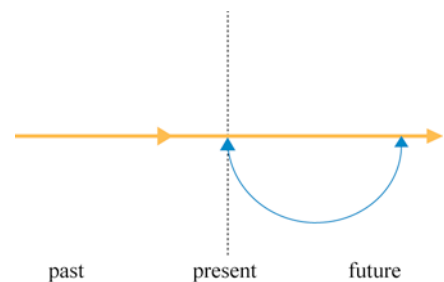
My Comments: Time is the fourth dimension of a space-time continuum in this movie. It is interesting to note that the H.G. Wells novel of the same title, on which this movie is based, was written before Einstein formulated his Special Theory of Relativity. George is able to move with ease backwards and forwards through the fourth dimension. It is hard to say whether he finds out if man can change his destiny because he does not travel back before the time he invented his time machine to change anything. He only changes things in the future. Because he did not know what the future would have been without his changes, he has nothing to compare it to. Therefore, maybe it was always his destiny to build the time machine and be part of that future. Maybe there never was another future before he went there. When George comes back to see his colleagues at the end of the 19th century, he could have done something drastic to try to change the future and then when he went back to the future, he could have seen if it had made any difference, but he did not do that because as he said, “The future is already there; it is irrevocable and cannot be changed.” This is the model of time that he believes in.

Time Travel Summary: The model of time used here is based on a block universe, where the past and future are fixed dimensions of a space-time continuum. Although no time travel takes place to the past, George clearly states that he believes in a fixed timeline.

Model of Time:

Closed past, closed future

Fixed timeline



The Time Machine (2002)

Director: Simon Wells.

094

Writing Credits: H. G. Wells (novel), David Duncan.

Production Company: Warner Bros. Pictures, DreamWorks SKG, Parkes/MacDonald Productions, Arnold Leibovit Entertainment.

Distributor: DreamWorks Distribution.

Actors: Guy Pearce (Alexander Hartdegen), Samantha Mumba (Mara), Mark Addy (David Filby), Sienna Guillory (Emma), Jeremy Irons (Über-Morlock).

Runtime: 96 minutes.

The Internet Movie Database User Rating: 5.6/10 25,452 votes

Overview: A scientist builds a time machine and finds he can change events in the past, but not change destiny. He then travels to the near future to find answers about time, but gets trapped 800,000 years in the future.

Plot Synopsis: Alexander is driven to get his time machine working so that he can go back in time to prevent his fiancée, Emma, from being shot. Four years later, he finally gets it working and uses it to avert her murder, only to witness her being shot later that day by another person. He concludes that although he is able to change events in the past, he is unable to change her destiny. He takes off in his machine to the future to find the answers about time. He visits the year 2030, and then 2037. After an accident with his controls, he ends up in 802,701, where he falls in love with Mara, a female Eloi. He meets the Über-Morlock, who explains that a temporal paradox prevented Alexander from saving Emma because if she had not died, he would never have built the time machine - so as soon as he saved her, she had to die again, so that he could have come back and be there. Alexander and the Über-Morlock fight and end up in the time machine, as it takes off into the future. They continue to fight and eventually Alexander throws him out of the time bubble surrounding the machine, where he observes him ageing rapidly until his death. The time machine stops in 635,427,810 AD, but not liking what he sees, Alexander travels back to save his love, Mara. Alexander's time machine gets destroyed, so that he cannot return, but he is happy to stay in the future and help build a new civilisation.

Genre: Science Fiction – Time Travel Vehicle.

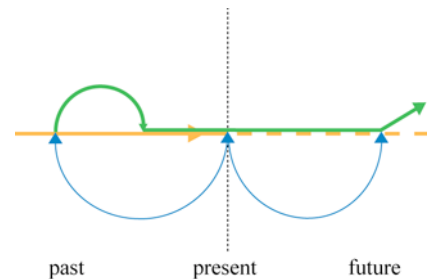
My Comments: This movie, like the original is based on the H.G. Wells novel of the same title, but his great grandson directs it this time. The protagonist, George is now called Alexander and in this adaptation, he does go back and change past events, but he is unable to change destiny. Note that a temporal paradox is explained in the movie dialogue. There is one problem with the time machine: In order to travel into the future, it would be moving through the dimension of time at a slower rate, so it would have to move through space at a faster rate, not sit still like in both the movies. Einstein showed that to travel to the future using time dilation, the time machine would have to travel at a very high speed relative to the Earth.

Time Travel Summary: Alexander goes back in time and is able to prevent Emma from being shot, so he could change the past, however she died the following day, so the timeline converged before his time travel began. He then travels into the future and helps the Eloi to change their destiny.

Model of Time:

Open past, open future

Converging timeline



***Timecop* (1994)**

Director: Peter Hyams.

095

Writing Credits: Mike Richardson, Mark Verheiden

Production Companies: Dark Horse Entertainment, JVC Entertainment, Largo Entertainment, Renaissance Pictures, Signature Pictures, Universal Pictures.

Distribution: Universal Pictures.

Actors: Jean-Claude Van Damme (Max Walker), Mia Sara (Melissa Walker), Ron Silver (Senator Aaron McComb).

Runtime: 98 minutes.

The Internet Movie Database User Rating: 5.4/10 12,704 votes

Overview: Senator McComb is stealing money from the past using time travel technology. Max is the time cop, who is sent back in time to catch him. The senator touches his past self, which causes both versions of him to disintegrate.

Plot Synopsis: Using time travel technology, Senator McComb is raiding money from the past to finance his corrupt presidential campaign. A special police force (T.E.C.) is set up to prevent the abuse of this new technology. They send Max Walker, a time cop, back in time and he manages to prevent the corrupt senator. In return, McComb sends men back in time to kill Walker and his wife, before he joins the force, but they only manage to kill his wife. Walker then goes back in time before the killing to prevent his wife's death, which he manages to do. He also tricks McComb into touching his past self, which causes them both to disintegrate. Walker returns to his original time to find life has continued without McComb, who mysteriously disappeared.

Genre: Science Fiction - Transporting Body Through Time.

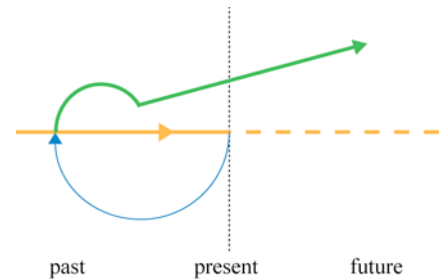
My Comments: There is no theoretical evidence to suggest that touching your other self would cause you any harm. It is not as if matter is coming into contact with anti-matter. The time traveller is merely meeting a younger version of himself. McComb goes back in time and dies whilst there, which means that with either model of time, he would just disappear from the timeline the day he went back in time and life would carry on without him. This of course would most certainly create a new future from that point on, but maybe he was always going to disappear on that day, so nothing has changed.

Time Travel Summary: Senator McComb makes several trips back in time to steal money and when he returns to the present, the timeline has converged back each time. However when someone is killed in the past, this is a large enough change to cause the timeline to continue diverging.

Model of Time:

Open past, open future

Double-well timeline



Timeline (2003)

Director: Richard Donner.

096

Writing Credits: Michael Crichton (novel), Jeff Maguire (screenplay).

Production Companies: Paramount Pictures, Mutual Film Company, Donners' Company, Cobalt Media Group, Artists Production Group.

Distribution: Paramount Pictures.

Actors: Paul Walker (Chris Johnston), Frances O'Connor (Kate Ericson), Gerard Butler (André Marek), Billy Connolly (Professor Edward A. Johnston), David Thewlis (Robert Doniger), Anna Friel (Lady Claire).

Runtime: 116 minutes.

The Internet Movie Database User Rating: 5.3/10 15,005 votes

Overview: A group of archaeological students travel through a wormhole to Castleguard, France in 1357 to retrieve their professor, who has already gone through, but is having problems getting back.

Plot Synopsis: International Technology Corporation (ITC) tries to send an object from their New Mexico lab to New York. It does not arrive there, but instead shows up in New Mexico a few hours later. In between, it had been in Castleguard, France in 1357, so they had accidentally discovered a wormhole, which was locked to a single time and place in the Middle Ages. Further experimentation shows that each object is broken into a stream of electrons in order to pass through the wormhole and that each trip has a time limit of six hours, or the object will be stuck there forever. A group of archaeological students go through this wormhole to retrieve their professor, who has already gone through it, but is having problems getting back. They all wear a watch, which shows how long they have left, and it has a button that will take them home if squeezed. Some of them end up in prison and they work out a plan to escape, based on what they already know from history about what will happen on that day. However, it fails, as their presence has already changed the timeline. They get involved in a famous battle during the Hundred Years War and dramatically change the timeline by saving the life of Lady Claire. Some of the group are killed there, some choose to remain and three make it back to their own time.

Genre: Science Fiction - Transporting Body Through Time.

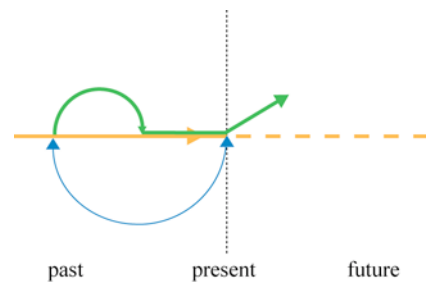
My Comments: The group works out a plan to escape from prison, based on what they already know from history about what will happen on that day. What they do not realise is that their presence has already changed the timeline.

Time Travel Summary: History is changed by their actions in the past, so it is open. However, the existence of the professor in the past had caused no change to their present before they left, so the timeline must have converged.

Model of Time:

Open past, open future

Converging timeline



TimeQuest (2002)

Director: Robert Dyke.

097

Writing Credits: Robert Dyke.

Production Companies: Destination Earth LLC.

Distribution: Ardustry Home Entertainment.

Actors: Victor Slezak (John F. Kennedy), Caprice Benedetti (Jacqueline Kennedy), Vince Grant (Robert F. Kennedy), Bruce Campbell (William Roberts), Barry Corbin (Lyndon Johnson), Larry Drake (J. Edgar Hoover), Ralph Waite (The Time Traveler).

Runtime: 92 minutes.

The Internet Movie Database User Rating: 5.0/10 301 votes

Overview: On 22nd November 1963, a man tells J. F. Kennedy that he has time-travelled back from the future and says he is the first to have done so. He warns him about his imminent assassination.

Plot Synopsis: On 22nd November 1963, a man wearing a space suit appears in Fort Worth, Texas in the hotel suite of John and Jackie Kennedy. He has time-travelled back from the future and says he is the first to have done so. He has come to warn JFK of his imminent assassination. He says, "History is primed to go down a path I won't allow." As the time of the murder approaches, he says, "I won't be here much longer. There is no future [for me]. The drift of time has been diverted and a new timeline has been created. The time I am from will disappear ... History has changed, but it has not solidified. When that defining moment takes place, new history will truly begin." He continues, "When that time passes ... I am the one who will be history ... I will survive, or at least another version of me will." JFK survives, the man in the spacesuit disappears into thin air and the world continues on an alternate timeline. The Kennedys get a copy of his fingerprints, which enables them to eventually find this man by the time he becomes an adult. They are afraid he will again invent a time machine and travel back and change history again, but maybe this time for the worse. Jackie becomes an anonymous benefactor of his artwork and he goes on to have a career as an artist, not a scientist.

Genre: Science Fiction - Transporting Body Through Time.

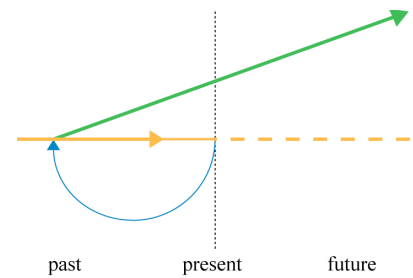
My Comments: By continually cutting from one time and story to another, this film tries to be art house, which becomes very confusing for a mainstream audience and quite annoying.

Time Travel Summary: History is changed and the timeline diverges forever.

Model of Time:

Open past, open future

Diverging timeline



***Timescape* (1992)**

aka '*Grand Tour: Disaster in Time*'

Director: David Twohy.

098

Writing Credits: Henry Cutler, C. L. Moore.

Production Companies: Channel Communications, Drury Lane Holdings, Wild Street Pictures.

Distribution: Anchor Bay

Actors: Jeff Daniels (Ben Wilson), Ariana Richards (Hillary Wilson), Emilia Crow (Reeve), Jim Haynie (Oscar).

Runtime: 99 minutes.

The Internet Movie Database User Rating: 6.6/10

692 votes

Overview: A group of time travelling tourists arrive from the future to observe a disaster. A local discovers their time-travelling technique and goes back one day to meet himself and save lives during the disaster.

Plot Synopsis: A group of time travellers come from the future to stay at Ben's house, high up on a hill, so they can observe a meteorite hitting his nearby village. They do not wish to change any events – only observe them. They are very careful not to change anything major. When they discover that Ben knows who they are, they are afraid his actions will have consequences in the perfect future world they come from. After he sees his daughter die in an explosion, the next day, he uses their time-travelling technique to go back one day, where he meets himself and together they save not just his daughter's life, but most of the villagers' lives.

Genre: Science Fiction – Transporting Body Through Time.

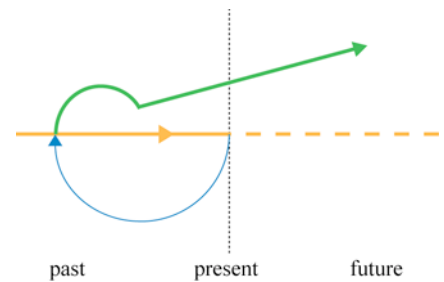
My Comments: This film was originally intended for theatrical release, but was shelved and eventually released only on video, which is surprising considering the quality of the film.

Time Travel Summary: The time travellers take great care not to change anything major because they believe that any small and significant changes will not cause the timeline to diverge too far so that it will be able to converge back. They are afraid that major actions that cause history to change will mean that the timeline will diverge such that they will not be able to return to the same world from which they came.

Model of Time:

Open past, open future

Double-well timeline



Twelve Monkeys (1995)

Director: Terry Gilliam.

099

Writing Credits: Chris Marker, David Webb Peoples.

Production Company: Atlas Entertainment, Classico, Universal Pictures.

Distributor: Universal Pictures.

Actors: Bruce Willis (James Cole), Madeleine Stowe (Kathryn Railly), Brad Pitt (Jeffrey Goines).

Runtime: 129 minutes.

The Internet Movie Database User Rating: 8.1/10 131,079 votes

Overview: A convict is sent back 39 years to gather information about a deadly virus released by a terrorist, which killed most of the human race. He is killed in a shooting at an airport terminal, as his younger self looks on.

Plot Synopsis: In the year 2035, only 1% of the world's population remains, due to a terrorist who has released a lethal virus at a string of cities around the world. Using a time machine, scientists send a series of convicts back to 1996, just before the virus was released. They are not hoping to change the past, only to gain a sample of the virus in its pure form, before it has mutated, so they can control it better in their world. They choose convicts with a strong visual memory, who will be able to retain detailed information about their trip. James Cole is chosen because of strong recurring images he has had since childhood of a running man being shot by a security guard at an airport. His mission is to locate 'The Twelve Monkeys', a radical group who they believe possess the virus. When in 1996, he can leave messages for the scientists by phoning a number, which has an answer phone, so they can listen to it in the future. He goes on to discover that the Twelve Monkeys are a harmless group of animal rights activists. His girlfriend, Kathryn, rings the answer phone and leaves an ironic message about the 'dangerous' Twelve Monkeys as a joke. This creates a causal loop because this message is why James was originally sent back in time. James then finds and chases the terrorist with the virus through an airport terminal. A small boy with his parents looks on in disbelief, as a security guard shoots James. Kathryn looks up and realises that the boy is witnessing his own death as an adult. The terrorist gets on the plane and sits next to the female scientist from the future, who has come to get a sample of the virus.

Genre: Science Fiction - Transporting Body Through Time.

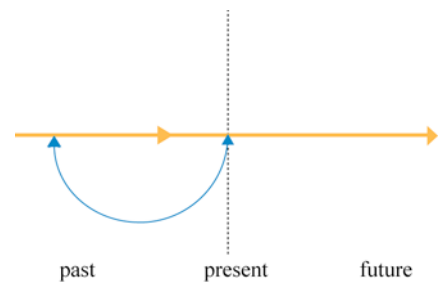
My Comments: This film is based on Chris Marker's acclaimed short film of stills, *La Jetée* (1962) that takes place in Paris in the aftermath of World War III.

Time Travel Summary: Each time James returns, nothing has changed in his world, which suggests that the model of time used here has a converging or double-well timeline. James said that he could not change his past, as it had already happened. So maybe parallel worlds exist, in which case it would make no difference to the scientists' timeline whether the terrorist was stopped or not. A change could only be made to their world by bringing the virus back in its pure form. Due to several causal loops that exist in the plot, the timeline in this film has to be fixed because although it looks like the past is being changed, in effect, every change that happens is causing the pre-existing future to occur.

Model of Time:

Closed past, closed future

Fixed timeline with a causal loop



***Vanilla Sky* (2001)**

Director: Cameron Crowe

100

Writing Credits: Alejandro Amenábar, Mateo Gil (both from film “Abre Los Ojos”)

Production Companies: Paramount Pictures, Cruise/Wagner Productions, Vinyl Films, Summit Entertainment, Artisan Entertainment, Sociedad General de Cine
Distribution: Paramount Pictures

Actors: Tom Cruise (David Aames), Penélope Cruz (Sofía Serrano), Cameron Diaz (Julie Gianni), Kurt Russell (McCabe).

Runtime: 136 minutes.

The Internet Movie Database User Rating: 6.9/10

76,140 votes

Overview: David elects to have his body cryonised soon after his death, so that he can continue to live his life as a lucid dream, in which he will not be aware that he has died. However the dream soon becomes a nightmare.

Plot Synopsis:

A medical company, called Life Extension (LE), is offering cryonisation to its clients, as a way of extending their lives. DNA codes of the human body have been broken, so that death is no longer necessary in a traditional sense. Within an hour of death, LE transfers the client’s body to a vessel, where it is sealed and frozen at 196° below zero. For a little extra money, LE offers the ‘Lucid Dream Option’: a cryonic union of science and entertainment. Someone suffering from a terminal illness can have their body preserved by cryonisation, so they can continue to live in the present, but with a future of their choosing. Their death is wiped from their memory and they live a dream, with their life becoming a “realistic piece of art painted by them”. LE’s panel of experts monitor the dream and the client’s every living thought. David spends an evening at a nightclub with his best friend and Sophia, a girl he barely knew. He never sees her again. He dies soon after, but before his death, he elects to be cryonised and taken back to the morning after the nightclub, where he begins a relationship with Sophia. However, his dream turns into a nightmare and he ends up in jail for her murder. He is finally works out what is going on and the dream is placed on pause. He turns down the chance return to his lucid dream and instead decides to be revived and live a real life in the future world he finds himself in. He says he does not want to dream any longer.

Genre: Science Fiction - Cryogenic Freezing.

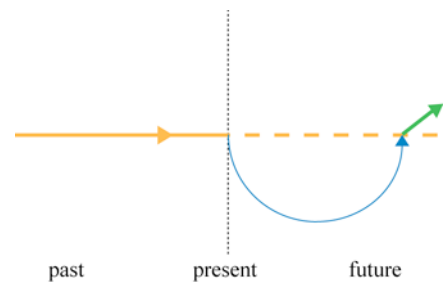
My Comments: This is a remake of the Spanish film, *Open Your Eyes* aka 'Abre Los Ojos' (1997) directed by Alejandro Amenábar. The plot is virtually identical, so I did not write a review of both films. David wakes to find himself in the distant future, so technically he has travelled forward through time. The difference to other films with cryogenic freezing, such as *Idiocracy* (2006), *Demolition Man* (1996), *Forever Young* (1992), *Austin Powers: International Man of Mystery* (1997) and *Sleeper* (1973) is that when he is frozen after his death, he has chosen to experience lucid dreams while frozen.

Time Travel Summary: David does not go back in time and change the past, but because he does not go back, we cannot say if it has been changed or not. He is not frozen until he dies a natural death, which means that he has not changed the timeline by unexpectedly disappearing from it. So, when he is unfrozen, he wakes up on the same timeline, but in the distant future. His appearance on this timeline may cause it to diverge, which would cause it to be open.

Model of Time:

Undefined past, open future

Future timeline



APPENDIX II: FILMS EXCLUDED

These films were not included in the original data set of 100 films listed in Appendix I for the following reasons:

Films watched after the deadline

By the time I had watched 100 films, I had elicited my different models of time and no new models were emerging, so I created a deadline of 31 Dec 2008. Therefore, any films that I watched after this date were excluded from my data set. There was a delay in getting hold of the following films for various reasons, which meant that I did not get to watch them until after my deadline had passed:

101. *Five Days to Midnight* (2004)

Overview: A scientist sends a briefcase back from the future to a time when she was a young girl. Its contents show her father how he will be murdered, so that he can use this information to change his future, thus preventing the murder.

Comments: Although nobody travels through time, an object containing information from the future does, so this is time travel.

Model of Time: Open past, open future, double-well replacement timeline.

102. *Arthur's Quest* (1999)

Overview: Merlin rescues the king's five-year-old son Arthur and together they escape through time to modern day America, where Arthur is left. Ten years later Merlin returns to collect Arthur, so that he can become king.

Comments: The timeline is changed because when Arthur returns home, he takes his girlfriend and his adopted mother with him. The history books are slightly different.

Model of Time: Open past, open future, diverging replacement timeline.

103. *Beneath the Planet of the Apes* (1970)

Overview: An astronaut follows the same path through space and time and his colleague in the original film, which means he arrives on Earth in the distant future where he finds Taylor on a planet ruled by apes.

Comments: Time dilation is used to travel into the future exactly as in the original *Planet of the Apes* (1969).

Model of Time: Undefined timeline.

104. *Bewitched* (2005)

Overview: Samantha does not like the results that Isabel's magic spell has on her love interest, so she uses her powers to rewind time to the moment before the spell is cast.

The timeline now follows the path it would have taken without the spell.

Comments: This is time travel because we see events passing in reverse order as Samantha rewinds time.

Model of Time: Open past, open future, diverging replacement timeline.

105. *Brigadoon* (1954)

Overview: Two Americans, hiking in the Scottish Highlands, stumble across a village that is not on their map. Every night its inhabitants go to sleep and when they wake up, the whole village has time travelled 100 years into the future.

Comments: Involuntary forwards time travel.

Model of Time: Open past, open future, diverging replacement timeline.

106. *Chiller* (1985)

Overview: Miles Creighton's mother elects to have him cryogenically frozen after a transplant operation goes wrong. Ten years later he is accidentally thawed, and when he returns to his old life, a priest realises that he has come back without a soul.

Comments: A horror film speculates on the hidden cost of using cryogenic freezing to time travel to the future.

Model of Time: Undefined.

107. *Cube 2: Hypercube* (2002)

Overview: A group of people are placed against their will into a hypercube, a four-dimensional room that allows for multiple parallel worlds to intersect. Only one of them figures out how to escape the hypercube before it implodes.

Comments: Each time they exit the room through one of the doors, they enter an identical room in another dimension.

Model of Time: Multiple parallel timeline.

108. *Future Cops* (1993)

aka 'Chao ji xue xiao ba wang' - English and Cantonese

Overview: In 2043 Judge Yu Ti Hung is about to sentence a terrorist, who commands three of his warriors to kill the judge in 1993. They go back in time using an experimental time machine to travel to. Three cops then chase them through time.

Comments: Although the characters do not return to their own time at the end, we are left with the assumption that the changes they made create a causal loop.

Model of Time: Fixed replacement timeline.

109. *The Last Day of Summer* (2007)

Overview: Luke wishes that tomorrow will never come. He gets a knock on the head and the day starts again. He always gets a knock on the head at the same time and place, and the day always starts again, until he eventually learns to make the right choices.

Comments: A virtual remake by of *Groundhog Day* (1993), but instead of the day restarting by waking from sleep, the timeline always converged to his head injury.

Model of Time: Open past, closed future, converging replacement timeline.

110. *The Love Letter* (1998)

Overview: Scotty Corrigan finds he can exchange letters with a lady who is living during the American Civil War by placing them in an antique desk that he has recently bought. They never meet, but each finds a look-a-like of the other in their own era.

Comments: Objects (their letters) travel back and forth through time, but not people. Based on a short story by Jack Finney. Uses similar concept to *The Lake House* (2006).

Model of Time: Open past, open future, diverging replacement timeline.

111. *Next* (2007)

Overview: Cris Johnson is able to see at least two minutes into the future, but only his future. As the future is not fixed, can change his actions in the present, thus creating a different future. The FBI wants him to use his powers to help them stop terrorists.

Comments: This film is another adaptation of a story by Philip K. Dick, where information comes back through time from the future.

Model of Time: Undefined past, open future, diverging replacement timeline.

112. *Past Perfect* (1996)

Overview: Three cops from 25 years in the future come back to the 90s to execute four teenagers who they know will become violent murderers in the future. They explain that they come back through time to “make the past perfect.”

Comments: One of them has a digital device of police records, which changes live time as they execute people from the past.

Model of Time: Open past, open future, converging replacement timeline.

113. *Paycheck* (2003)

Overview: Jennings agrees to have his memory wiped after working on a top-secret project: a machine that can see into the future. He finds he will be killed and therefore warns his future self (after the memory wipe) thus changing his destiny.

Comments: This film is another adaptation of a story by Philip K. Dick, where information comes back through time from the future.

Model of Time: Undefined timeline.

114. *Pirates of the Plain* (1999)

Overview: A large cloud gathers over a pirate ship in the past and sucks it and its crew into the sky, before landing them in the middle of a cornfield in present-day Nebraska. At the end of the film they return, but the captain then travels back to the present.

Comments: Backwards and forwards time travel both take place.

Model of Time: Undefined timeline.

115. *The Promise* (2005)

aka 'Wu ji' - Mandarin

Overview: The slave Kunlun is carried back five years by his desire, and he can see the past, which he cannot change. However, he returns and learns that fate can be changed if “time flows backwards, winter falls in the spring, and the dead come back to life.”

Comments: This film has a similar concept to *Click* (2006) in that Kunlun can see a past that cannot interact with. He uses this information to change his destiny.

Model of Time: Closed past, open future, diverging replacement timeline.

116. *The Seeker: The Dark Is Rising* (2007)

Overview: Soon after his 14th birthday Will Stanton gains powers that allow him to time travel. He travels back and forth to various points in history to gather six hidden signs that he needs to help the light defeat the forces of darkness in the present.

Comments: When he arrives back in the present after each return trip to the past, any changes he made were not lasting because the timeline always converges back.

Model of Time: Open past, closed future, converging replacement timeline.

117. *Southland Tales* (2006)

Overview: Due to the rotation of Earth being slowed down, environmental anomalies have sprung up such as a rift in space-time. It causes Boxer Santaros to travel 69 minutes back in time, thus creating a past and a present version of him.

Comments: Written and directed by Richard Kelly, who also used a rift in space-time in his previous film, *Donnie Darko* (2001).

Model of Time: Open past, open future, converging replacement timeline.

118. *Timecop 2: The Berlin Decision* (2006)

aka 'Timecop: The Berlin Decision'

Overview: Ryan Chan, a cop from the Time Enforcement Commission (TEC) makes several return trips into the past to prevent Brandon Miller from trying to eliminate TEC by killing the ancestors of all of its employees.

Comments: Backwards time travel is used to change the past timeline, thus creating a different present and future when the travelers return.

Model of Time: Open past, open future, diverging replacement timeline.

119. *Timecrimes* (2007)

aka 'Los cronocrímenes' - Spanish

Overview: Héctor accidentally climbs into a time machine, and goes back to earlier in the same day, where he fails in his attempt to kill his other self. He then goes back in the time machine and returns slightly earlier as Héctor 3, as the plot gets complicated.

Comments: Backwards time travel is used, but changes to the timeline are not what they seem while a series of causal time loops keep the timeline consistent.

Model of Time: Fixed replacement timeline.

120. *Tom's Midnight Garden* (1999)

Overview: During the night, whenever the grandfather clock strikes 13, Tom's backyard suddenly becomes a 19th century sunlit garden. Each time he visits, he meets a girl at a different time in her life, but not in order. He then meets her as an old lady.

Comments: He steps in and out of her life, interacting with her. Nothing he does there causes anything to change whenever he returns to the present.

Model of Time: Fixed replacement timeline.

121. *Twilight Zone: The Movie* (1983)

Overview: Five old television episodes are re-shot and combined to make a film. The first segment involves involuntary time travel back to three different historically significant periods and the second has people reverting to their childhood bodies.

Comments: Time travel takes place in the first segment, but changes to their bodies in the second segment are physiological and not temporal.

Model of Time: Open past, open future, converging replacement timeline.

Films released after the deadline

The following films were released in 2009, but because the cut-off date of my initial study was the end of 2008, they were not able to be included in that study. I watched and reviewed them all in case one of them was using a model of time that I had not yet discovered.

122. *The Butterfly Effect 3: Revelations* (2009)

Overview: Sam Reide can time travel to specific places in the past. While there he views murders in order to identify the unknown killer for the police, but if he changes anything significant while there, he finds the timeline has diverged upon his return.

Comments:

Uses the same model of time as the previous two films of the trilogy, but this time he arrives in the past in his current body, not inside his youthful body as before.

Model of Time: Open past, open future, diverging replacement timeline.

123. *Land of the Lost* (2009)

Overview: Dr Marshall invents a tachyon amplifier, which he uses to travel “through a time portal from our Earth to another dimension,” where the past, present and future all meet. He hopes to solve our energy crisis by accessing trans-dimensional energy.

Comments: This alternate reality has animals from our past, with artifacts from our present and technology from the future, so it has a different arrow of time to our world.

Model of Time: Undefined timeline.

124. *Star Trek* (2009)

Overview: A Romulan starship and another ship with Ambassador Spock on board are caught in the event horizon of a black hole. This causes the Romulans to travel back in time to 2233; Spock also travels back, but arrives 25 years later.

Comments: One-way backwards time travel is used as a plot device to allow an aging character of the TV series to interact with some of the more recent characters.

Model of Time: Open past, open future, diverging replacement timeline.

125. *The Time Traveler’s Wife* (2009)

Overview: Chrono-displacement is a rare genetic disorder that causes Henry to involuntarily disappear and reappear along the timeline in a random order. He marries Clare, who never knows how long he will be away each time.

Comments: Henry knows how he will die, and cannot prevent it. His past actions help to cause his death, so this film uses the predestination paradox.

Model of Time: Fixed replacement timeline.

Films that got away

I had watched the following films before I began this research, but forgot that time travel or other temporal phenomena were involved. I watched them again after the deadline, and discovered that they could have been included in my data set:

126. *Alien* (1979)

Overview: The crew of a spaceship enter ‘hypersleep’ in their cryogenic sleep chambers, so they do not age during their long space journey. Only Ripley escapes and begins cryogenic sleep in the shuttle she is using to get back to Earth.

Comments: Cryogenic sleep, a form of future time travel, is not essential to the plot; it was just used to explain how the crew travels so far into deep space.

Model of Time: Undefined timeline.

127. *Aliens* (1986)

Overview: Ripley and her cat have been drifting in space in a cryogenic sleep for 57 years, when she is rescued. On her return to Earth, she finds that her young daughter that she left behind has since died of old age. Hypersleep is used again for a return trip to deep space.

Comments: As above.

Model of Time: Undefined timeline.

128. *Alien3* (1992)

Overview: Ripley and the remaining crewmembers crash-land on another planet while in hypersleep. She wakes from her cryogenic sleep to find that she is the sole survivor of the crash.

Comments: As above.

Model of Time: Undefined timeline.

129. *Close Encounters of the Third Kind* (1977)

Overview: At the start of the film, a range of close UFO encounters occurs. A squadron of World War II aircraft that were reported missing in 1945 reappear in the Mexican desert in good working order, but without their pilots. No other time travel takes place.

Comments: This brief example of forwards time travel was only occurrence in the film of temporal phenomena.

Model of Time: Undefined timeline.

130. *Jumanji* (1995)

Overview: When the board game is over, time is turned back to 1969. Although Alan and Sarah are now children, they remember everything that they experienced in that alternate future.

Comments: Time reversal back to 1969 caused the timeline to change from that point on. Definitely time travel if you consider the events of the game to have been real.

Model of Time: Open past, open future, diverging replacement timeline.

131. *Lara Croft: Tomb Raider* (2001)

Overview: At the end of the film, Lara meets her father in a strange crossing of spacetime. Then time is reversed before Lara destroys the Triangle of Light, so that time can return to normal.

Comments: Backwards time travel is only used once at the end of the film as a plot device to bring West back to life and for Lara to communicate with her dead father.

Model of Time: Open past, open future, diverging replacement timeline.

132. *Minority Report* (2002)

Overview: Set in the near future, the Police Department use precognitive humans to see future crimes. This information helps to find the crime's location and intercept just before it is about to take place.

Comments: This film is another adaptation of a story by Philip K. Dick, where information comes back through time from the future.

Model of Time: Undefined past, open future, diverging replacement timeline.

Films with no time travel or other temporal phenomena

The following films were indicated as involving time travel or other temporal phenomena on various websites; however, after reviewing them I deemed their content too ambiguous for them to be included in my data set. Therefore, these films have not been allocated a model of time.

133. *17 Again* (2009)

Overview: The high school janitor causes Mike, a middle-aged father, to fall off a bridge and through a time vortex into the river, which causes him to re-inhabit his teenage body in the present. After a few weeks the janitor changes his body back.

Comments: He remains in the present time frame with full memory, so no time travel takes place. The changes to his body are physiological and not temporal.

134. 2046 (2004)

Overview: In one part of this film, a man in Hong Kong writes a sci-fi novel set in the distant future about a mystical train that carries lonely souls to a mysterious place called 2046, where nothing ever changes, so there is never loss or sadness.

Comments: Time travel does not actually take place in the film, it is just written about in his novel.

135. *Before Sunrise* (1995)

Overview: A young couple meet on a train and talk about mental time travel into the future to observe their past regrets. They want to make sure that the decisions they make today about their relationship do not become a past regrets in their future.

Comments: Time travel does not actually take place in the film, they just talk about the possibility of mental time travel.

136. *Blast from the Past* (1999)

Overview: A family in Los Angeles enter a private nuclear fallout shelter and lock the door. The son goes up 35 years later to look for food and supplies with his 1960s values having spent his whole life in the shelter influenced only by his conservative parents. He is shocked by what he sees, but soon adapts and finds a girlfriend.

Comments: No time travel takes place in this film.

137. *Doctor Who and the Daleks* (1965)

Overview: The TARDIS takes Doctor Who and his fellow travellers across the universe to another planet and then back home again at the end of the film.

Comments: They are able to travel across the universe in a relatively short time frame, but this does not necessarily mean they time-travelled.

138. *Event Horizon* (1997)

Overview: The *Starship Event Horizon* returns seven years after having travelled to the other side of the universe through an artificially created black hole, which provides a shortcut between two distant points in space.

Comments: This film includes travel through an Einstein-Rosen bridge, but no time travel takes place.

139. *The Fountain* (2006)

Overview: Three parallel stories: one about a conquistador in the past, one about a present-day scientist and one about an astronaut in the future. They each address the same issues in their respective periods: love and death.

Comments: The main characters are the same in each parallel story, but are not the same person moving back and forth through time, so this is not a time travel film.

140. *The Langoliers* (1995)

Overview: An airplane passes through a rip in time and everyone disappears except for the eight passengers who were asleep at the time. They see giant packmen eating up the special dimension that time left behind!

Comments: Not time travel as such, but the story offers a speculative theory about what happens to space when time has moved on.

141. *Melinda and Melinda* (2004)

Overview: Two guys in a restaurant start telling a story about Melinda, one with a comic bent, the other tragic. Both stories have the same start and run in parallel contrasting the different destinies of the two Melindas.

Comments: This is not a time travel film; it is more of a film about alternate realities. However, it is not based on reality because it is just storytelling.

142. *Orlando* (1992)

Overview: A young man is given property by an aged Queen Elizabeth I on the one condition that he never grows old, which he then magically achieves. After a century, he turns into a woman. The film ends 300 years later with her “having hardly aged a day”.

Comments: This film does not involve time travel or temporal phenomena, rather just the biological phenomenon, which is immortality.

143. *Pleasantville* (1998)

Overview: A brother and sister fight over a new TV remote, as she does not want to watch *Pleasantville*, a re-run of a 1950s soap opera that he is watching. A button is pushed on the remote, which transports them both into the show.

Comments: Not really time travel, as they do not move along a timeline, nor do they jump onto a parallel universe; instead, they find themselves in an artificial reality.

144. *Science of Sleep* (2006)

aka 'La science des rêves'

Overview: Stéphane tries to impress Stéphanie by giving her his latest invention: a time machine that supposedly turns time back one second. This gift appears several times in the movie, but does not appear to work.

Comments: There is talk of a time machine, but no time travel takes place in this French-language film.

145. *Special* (2006)

aka 'La science des rêves'

Overview: Les Franken is taking part in a medical drug-testing program, when he starts to hallucinate that he has superhuman powers. He meets an older version of himself who has travelled back from the future to help him.

Comments: The belief that he had met future self, just like he supposed superhuman powers were hallucinations that only he and nobody else could see.

146. *2001: A Space Odyssey* (1968)

Overview: At the film's end, an astronaut arrives on Jupiter and enters a monolith. He travels across space in what appears to be a wormhole. He then rapidly ages until he finds himself lying on his deathbed, at the foot of another monolith.

Comments: He did not travel through time, and his rapid aging is a physiological phenomenon rather than a temporal one.

147. *Star Wars: Episode V - The Empire Strikes Back* (1980)

Overview: The crew of the *Millennium Falcon* fail to enter hyperspace because their hyperdrive was de-activated. At the end of the film, R2-D2 manages to reactivate it so they can escape from the three-dimensional world into hyperspace.

Comments: Hyperspace refers to a world that exists in a higher dimension, but still in our world, and not in a parallel world; therefore, this is not a temporal phenomenon.

148. *Star Wars Episode VI: Return of the Jedi* (1983)

Overview: Before the battle over Endor, the Rebel fleet emerges from hyperspace, which causes them to suddenly appear in the three-dimensional world.

Comments: As above.

Running time is less than 80 minutes

A film had to have a running time of longer than 80 minutes to be included in my data set. This was how I chose to separate the ‘full-length’ films from the ‘shorts’. The following ‘short’ films were watched and reviewed, but could not be included:

149. *La Jetée* (1962)

Overview: After World War III scientists are researching time travel, so that they can bring food and supplies back to the future. The plot revolves around a man’s childhood memories, which create a predestination paradox.

Comments: A short time travel film of black and white stills with a French voiceover. This was the inspiration for *Twelve Monkeys* (1995). Running time only 28 minutes.

Model of Time: Fixed replacement timeline.

150. *The Day Time Ended* (1980)

Overview: A family and their house are suddenly sucked into a time warp that transports them backwards and forwards through time to various ages, including one where they witness two dinosaurs fighting.

Comments: Backwards and forwards time travel, but only 79 minutes long.

Model of Time: Fixed replacement timeline.

151. *Pokémon 4Ever* (2002)

aka ‘Pokémon 4: Ever’

Overview: In this Japanese animée, a type of Pokémon called a Celebi has the ability to time travel, and transports itself and Sam 40 years into his future to our present. Various time travel takes place, before the Celebi takes Sam back to his own time at the end.

Comments: Back and forwards time travel, but only 75 minutes long.

Model of Time: Undefined timeline.

152. *Primer* (2004)

Overview: Two young men accidentally create a time machine, which allows one person to go back in time, but only as far as its ‘turn-on’ time. The time traveller has to spend an hour in a ‘failsafe’ machine for every hour that he wishes to go back in time.

Comments: A very deep film that involves backwards time travel and ever increasingly complex situations involving temporal paradoxes, but only lasts 77 minutes.

Model of Time: Open past, open future, diverging replacement timeline.

Original version of film and remake are too similar

The following films are the original version of the film, but were watched after reviewing the remake. I decided that the plot was too similar to the original for them to be included as a separate film entry in my data set.

153. *Open Your Eyes* (1997)

aka 'Abre los Ojos'

Overview: César signs up to have his body cryonised soon after his death, so that he can be reborn in the future and live his life with “artificial perception”. In his cryonic dream he is not aware that he has died and his fantasy becomes a nightmare.

Comments: The review of the remake of *Vanilla Sky* (2001) will suffice as it has a virtually identical plot as this Spanish-language original.

Model of Time: Undefined timeline.

154. *The Visitors* (1993)

aka 'Les Visiteurs'

Overview: A wizard's potion has been incorrectly mixed and instead of travelling back one day to right a wrong, the spell catapults them “through the corridors of time” to present-day France.

Comments: The review of the remake *Just Visiting* (2001) will suffice as it has a virtually identical plot as this French-language original.

Model of Time: Open past, open future, diverging replacement timeline.

155. *Ghosts of Girlfriends Past* (2009)

Overview: Three ghosts visit the womanising Connor at his brother's wedding, and take him through time to view his past, present, and his lonely future.

Comments: The review of *A Christmas Carol* (2004) has a similar plot and uses the same model of time. See following for a full list of film adaptations of this book.

Model of Time: Closed past, open future, diverging replacement timeline.

Films based on *A Christmas Carol*

Rather than a remake of an original, the following films are all adaptations of the same book, *A Christmas Carol* by Charles Dickens. I only included one adaptation, *A Christmas Carol* (2004) in my data set because after watching *Ghosts of Girlfriends Past* (2009), it became clear that they were all using the same model of time. Any one

of the films in the following list could have been chosen as the one in my data set, as they all run for at least 80 minutes.

156. *An American Christmas Carol* (1979) - 98 mins
157. *A Carol Christmas* (2003) - 120 mins
158. *A Carol of Christmas* (2005) - 101 mins
159. *A Christmas Carol* (1950) - 120 mins
160. *A Christmas Carol* (1981) - 110 mins
161. *A Christmas Carol* (1982) - 87 mins
162. *A Christmas Carol* (1984) - 100 mins
163. *A Christmas Carol* (1999) - 95 mins
164. *A Christmas Carol* (2009) - 98 mins
165. *A Christmas Carol at Ford's Theatre* (1979) - 120 mins
166. *A Diva's Christmas Carol* (2000) - 120 mins
167. *Carol for Another Christmas* (1964) - 84 mins
168. *Ebbie* (1995) - 96 mins
169. *Ebenezer* (1997) - 89 mins
170. *The Muppet Christmas Carol* (1992) - 85 mins
171. *Scrooge* (1951) - 86 mins
aka '*A Christmas Carol*'
172. *Scrooge* (1970) - 113 mins
173. *Scrooged* (1988) 101 mins
174. *Skinflint: A Country Christmas Carol* (1979) - 120 mins

Films not watched

During my research, the following films were identified as potentially involving time travel or other temporal phenomena with a running time of 80 mins or more. However, as they were unavailable to watch, it was not possible to verify that, or to write up a review of them, so they were not included in my data set. The cut-off date for this list is the end of 2009; any films released after this have not been included. If the original language of any of these films is not English, I have noted the language at the end of the entry. Note that films with two titles always have their English title first.

175. *100 Million BC* (2008) - 85 mins
176. *11 Minutes Ago* (2007) - 83 mins

177. *12.01* (1993) - 92 mins
178. *2009 Lost Memories* (2002) - 136 mins
179. *A.P.E.X.* (1994) - 98 mins
aka 'Apex'
180. *A.R.O.G.* (2008) - 127 mins - Turkish
181. *Ali Baba Goes to Town* (1937) - 80 mins
182. *Aliens in the Wild, Wild West* (1999) - 90 mins
183. *All Over Again* (2001) - 99 mins
aka 'Against Time'
184. *Almost Normal* (2005) - 90 mins
185. *Always Will* (2007) - 90 mins
186. *The Amazing Mr. Blunden* (1972) - 99 mins
187. *Amityville 1992: It's About Time* (1992) - 91 mins
188. *Ancient Relic* (2002) - 182 mins
aka 'The Hunt for the Hidden Relic'
aka 'Das Jesus Video' - German
189. *An Angel for May* (2002) - 95 mins
190. *Another Day* (2001) - 90 mins
191. *Another Flip for Dominick – BBC Play for Today* (1982) - 90 mins
192. *Arthur the King* (1985) - 94 mins
aka 'Merlin & the Sword'
193. *As Time Goes By* (1988) - 96 mins
194. *Back to the Planet of the Apes* (1981) - 92 mins
195. *Be With You* (2004) - 119 mins
aka 'Ima, ai ni yukimasu' - Japanese
196. *Beasties* (1991) - 83 mins
aka 'The Bionaut'
197. *Beastmaster 2: Through The Portal of Time* (1991) - 107 mins
198. *Bender's Big Score* (2007) - 88 mins
199. *Berkeley Square* (1933) - 84 mins
200. *Between Time and Timbuktu* (1972) - 90 mins
201. *Blind Chance* (1981) - 114 mins - Polish
202. *Blue Flame* (1993) - 88 mins
203. *Blue Moon* (2000) - 89 mins

204. *The Blue Yonder* (1985) - 92 mins
205. *Bottom Live 2003: Weapons Grade Y-Fronts Tour* (2003) - 93 mins
206. *Bridge Across Time* (1985) - 100 mins
207. *Brigadoon* (1966) - 90 mins
208. *Brother Future* (1991) - 103 mins
209. *Buck Rogers in the 25th Century* (1979) - 89 mins
210. *Buhera Mátrix* (2007) - 80 mins - Hungarian
211. *Cavegirl* (1985) - 85 mins
212. *A Chinese Odyssey Part One: Pandora's Box* (1994) - 87 mins
 aka 'Sai yau gei: Dai yat baak ling yat wui ji - Yut gwong bou haap'
 - Cantonese
213. *A Chinese Odyssey Part Two: Cinderella* (1994) - 95 mins
 aka 'Xi you ji da jie ju zhi xian lu qi yuan' - Cantonese
214. *Clockmaker* (1998) - 90 mins
215. *The Cold Room* (1984) - 95 mins
 aka 'The Prisoner'
 aka 'Kalter Hauch der Vergangenheit' - English & German
216. *Conceiving Ada* (1997) - 85 mins
217. *A Connecticut Yankee* (1931) - 95 mins
218. *A Connecticut Yankee* (1955) - 90 mins
219. *A Connecticut Yankee in King Arthur's Court* (1921) - 80 mins (silent film)
220. *A Connecticut Yankee in King Arthur's Court* (1989) - 95 mins
221. *The Corridors of Time* (1998) - 118 mins
 aka 'Les Couloirs du temps: Les Visiteurs 2' - French
222. *Crossworlds* (1997) - 90 mins
223. *Crusade: A March Through Time* (2006) - 125 mins
 aka 'Crusade in Jeans'
 aka 'Kruistocht in spijkerbroek'
224. *Cyborg 2087* (1966) - 86 mins
 aka 'Man From Tomorrow'
225. *Dandy Dust* (1998) - 94 mins
226. *Dark Paradox* (2007) - 89 mins
227. *Day Watch* (2006) - 132 mins
 aka 'Night Watch 2'

- aka 'Dnevnoy dozor' - Russian
228. *Der Trip - Die nackte Gitarre 0,5* (1996) - 90 mins - German
229. *The Devil's Muse* (2007) - 105 mins
230. *Dimension 5* (1966) - 91 mins
 aka 'Dimension Five'
 aka 'Dimension Four'
231. *Dinosaur Valley Girls* (1996) - 94 mins
232. *Dream of a Warrior* (2001) - 100 mins
 aka 'Cheonsamong' - Korean
233. *Dreamship Surprise: Period 1* (2004) - 87 mins
 aka '(T)Raumschiff Surprise - Periode 1' - German
234. *The Drivetime* (1995) - 88 mins
235. *Dustclouds* (2007) - 142 mins
236. *El Niño Invisible* (1995) - 80 mins - Spanish
237. *Eliminators* (1986) - 96 mins
238. *The Ends of the Earth* (2009) - 89 mins
239. *Escape from the Planet of the Apes* (1971) - 98 mins
240. *Escape Through Time* (1993) - 150 mins
241. *Escape to Grizzly Mountain* (2000) - 95 mins
242. *The Excalibur Kid* (1999) - 88 mins
243. *The Exotic Time Machine* (1998) - 78 mins
244. *The Exotic Time Machine II: Forbidden Encounters* (2000) - 78 mins
245. *Fetching Cody* (2005) - 87 mins
246. *Fiddlers Three* (1944) - 88 mins
 aka 'While Nero Fiddled'
247. *The Flight of Dragons* (1982) - 96 mins
248. *Fish Story* (2009) - 112 mins
 aka 'Fisshu sutôri' - Japanese
249. *The Flipside of Dominick Hide – BBC Play for Today* (1980) - 90 mins
250. *For All Time* (2000) - 84 mins
251. *Frankenstein Unbound* (1990) - 82 mins
252. *Frenchman's Farm* (1987) - 100 mins
253. *Frequently Asked Questions About Time Travel* (2009) - 83 mins
254. *From Time to Time* (2009) - 95 mins

255. *Futurama: Bender's Big Score* (2007) - 88 mins
256. *Future Hunters* (1986) - 96 mins
257. *Future War* (1997) - 90 mins
258. *Future Zone* (1990) - 82 mins
aka '*Future Force 2*'
259. *G.I. Samurai* (1979) - 139 mins
aka '*Time Slip*'
aka '*Sengoku jieitai*' - Japanese
260. *The Girl from Tomorrow* (1992) - 104 mins
261. *The Girl, the Gold Watch & Dynamite* (1981) - 93 mins
262. *The Girl, the Gold Watch & Everything* (1980) - 100 mins
263. *The Girl Who Cut Time* (1983) - 104 mins
aka '*The Little Girl Who Conquered Time*'
aka i - Japanese
264. *Glorious Times in the Spessart Inn* (1967) - 105 mins
aka '*Herrliche Zeiten im Spessart*' - German
265. *God of Gamblers III: Back to Shanghai* (1991) - 116 mins
aka '*Du xia II: Shang Hai tan du sheng*' - Cantonese, English & Mandarin
266. *Godzilla vs. King Ghidorah* (1991) - 103 mins
aka '*Gojira vs. Kingu Gidorâ*' - Japanese
267. *Grizzly Mountain* (1997) - 96 mins
268. *Hamlet A.D.D.* (2007) - 100 mins
269. *Happy Accidents* (2000) - 110 mins
270. *He Ain't Heavy, He's My Brother* (1993) - 97 mins
aka '*He Ain't Heavy... He's My Father*'
aka '*Once Upon a Mid-Autumn Festival*'
aka '*Xin nan xiong nan di*' - Cantonese
271. *The Heavenly Kid* (1985) - 90 mins
272. *Heaven's Soldiers* (2005) - 106 mins
aka '*Cheon Gun*' - Korean
273. *Hercules in New York* (1970) - 91 mins
274. *Hero Beyond the Boundary of Time* (1993) - 94 mins
aka '*Wei Xiao Bao zhi feng zhi gou nu*' - Cantonese
275. *Hellraiser: Bloodline* (1996) - 86 mins

276. *The House in the Square* (1951) - 90 mins
277. *The I Inside* (2003) - 90 mins
278. *I Killed Einstein, Gentlemen* (1970) - 95 mins
aka 'Zabil jsem Einsteina, panove' - Czech
279. *Iceman* (1984) - 100 mins
280. *The Iceman Cometh* (1989) - 114 mins
aka 'Ji dong ji xia' - Cantonese
281. *Idaho Transfer* (1973) - 86 mins
282. *Il Mare* (2000) - 105 mins
aka 'Siworae' - Korean
283. *In His Father's Shoes* (1997) - 105 mins
284. *In the Year 2889* (1967) - 80 mins
285. *Inuyasha the Movie: Affections Touching Across Time* (2001) - 100 mins
aka 'Inuyasha: The Love That Transcends Time'
aka 'Inuyasha - Jidai wo koeru omoi' - Japanese
286. *It Happened Tomorrow* (1944) - 85 mins
287. *Ivan Vasilievich: Back to the Future* (1973) - 93 mins
aka 'Ivan Vasilyevich Changes Occupation'
aka 'Ivan the Terrible: Back to the Future'
aka 'Ivan Vasilevich menyaet professiyu' - Russian and German
288. *Izo* (2004) - 128 mins - Japanese and English
289. *Je t'aime, je t'aime* (1968) - 91 mins - French
290. *The Jetsons Meet the Flintstones* (1987) - 89 mins
291. *Johnny and the Bomb* (2006) - 120 mins
292. *Josh Kirby... Time Warrior: Chapter 1, Planet of the Dino-Knights* (1995) - 88 mins
293. *Josh Kirby... Time Warrior: Chapter 2, the Human Pets* (1995) - 90 mins
294. *Josh Kirby... Time Warrior: Chapter 3, Trapped on Toyworld* (1996) - 90 mins
295. *Josh Kirby... Time Warrior: Chapter 4, Eggs from 70 Million B.C.* (1996) - 93 mins
296. *Josh Kirby... Time Warrior: Chapter 5, Journey to the Magic Cavern* (1996) - 93 mins
297. *Josh Kirby... Time Warrior: Chapter 6, Last Battle for the Universe* (1996) - 90 mins

298. *Journey to the Beginning of Time* (1955) - 93 mins
 aka '*Journey to Prehistory*'
 aka '*Cesta do praveku*' - Czech
299. *Jubilee* (1978) - 100 mins
300. *Just Imagine* (1930) - 109 mins
301. *Karate Cop* (1991) - 90 mins
302. *Kin-Dza-Dza* (1986) - 135 mins - Georgian & Russian
303. *A Knight in Camelot* (1998) - 90 mins
304. *La Edad de Piedra* (1964) - 90 mins - Spanish
305. *90 min* (1998) - 90 mins
306. *Lancelot: Guardian of Time* (1997) - 90 mins
307. *Lensman: Secret of the Lens* (1984) - 107 mins
 aka '*SF Shinseiki Lensman*' – Japanese
308. *Last Exit to Earth* (1996) - 86 mins
309. *Late for Dinner* (1991) - 99 mins
310. *Last Android* (2005) - 95 mins
 aka '*Ainoa*' - German
311. *The Life Before This* (1999) - 92 mins
312. *Light Years* (1988) - 83 mins
 aka '*Gandahar*' - French
313. *The Lords of Magick* (1989) - 98 mins
314. *Lovable Zanies II* (1988) - 94 mins
 aka '*Three Crazy Jerks II*'
 aka '*Zärtliche Chaoten II*' - German
315. *Love in the Time of Twilight* (1995) - 103 mins
 aka '*Hua yue jia qi*' - Cantonese
316. *The Love Letter* (1998) - 99 mins
317. *Love Story 2050* (2008) - 180 mins
318. *Magic Müller* (1993) - 90 mins - German
319. *The Man from the First Century* (1961) - 85 mins
 aka '*It's All Einstein's Fault*'
 aka '*Muz z prvního století*' - Czech
320. *The Man Who Used to Be Me* (2000) - 88 mins
321. *Manhunt of Mystery Island* (1945) - 219 mins

322. *Mannequin: On the Move* (1991) - 95 mins
323. *Masters of the Universe* (1987) - 106 mins
324. *Maybe* (1999) - 109 mins
aka 'Peut-être' - French
325. *The Meeksville Ghost* (2001) - 95 mins
326. *The Milky Way* (1969) - 98 mins
aka 'La via lattea'
aka 'La voie lactée' - French, Italian and Latin
327. *Millennium* (1989) - 108 mins
328. *Minutemen* (2008) - 98 mins
329. *Miracle in Valby* (1989) - 80 mins
aka 'Miraklet i Valby' – Danish
330. *The Miracle of P. Tinto* (1998) - 106 mins
aka 'El milagro de P. Tinto' - Spanish
331. *Mirror for a Hero* (1987) - 139 mins
aka 'Zerkalo dlya geroya' - Russian
332. *Miss Morrison's Ghosts* (1981) - 104 mins
333. *Mr. Rossi Looks for Happiness* (1976) - 80 mins
aka 'Il signor Rossi cerca la felicità' - Italian
334. *My Mother the Mermaid* (2004) - 110 mins
aka 'Ineo gongju' - Korean
335. *My Science Project* (1985) - 94 mins
336. *Nautilus* (2000) - 97 mins
337. *Nem Sansão Nem Dalila* (1955) - 90 mins - Portuguese
338. *Nemesis 2: Nebula* (1995) - 83 mins
339. *Next* (2007) - 96 mins
340. *The Next One* (1984) - 105 mins
aka 'The Time Traveller'
341. *Norman's Awesome Experience* (1989) - 87 mins
aka 'A Switch in Time'
342. *Nostradamus* (2000) - 119 mins
343. *Nothing Left to Do But Cry* (1985) - 113 mins
aka 'Non ci resta che piangere' - Italian
344. *Os Xeretas* (2001) - 90 mins

345. *Out of Time* (1988) - 92 mins
346. *Out of Time* (2000) - 95 mins
347. *Paprika* (2006) - 90 mins
aka 'Papurika' - Japanese
348. *Paris Does Not Exist* (1969) - 100 mins
aka 'Paris n'existe pas' - French
349. *On The Air* (1995) - 96 mins
aka 'En el Aire' - Spanish
350. *Phantasm IV: Oblivion* (1998) - 90 mins
351. *Piratas en el Callao* (2005) - 78 mins - Spanish
352. *Portrait of Jennie* (1948) - 86 mins
353. *Prince of Persia: The Sands of Time* (2010) - 116 mins
354. *Próxima* (2007) - 116 mins
355. *Quest for Love* (1971) - 87 mins
356. *Repeat Performance* (1947) - 91 mins
357. *Retrograde* (2004) - 93 mins
358. *Roman Scandals* (1933) - 92 mins
359. *Running Against Time* (1990) - 92 mins
360. *Russian Ark* (2002) - 99 mins
aka 'Russkiy kovcheg' - Russian
361. *S. Darko* (2009) - 103 mins
362. *S.O.S. Galw Gari Tryfan* (2008) - 90 mins
363. *Saint Sinner* (2002) - 90 mins
aka 'Clive Barker's Saint Sinner'
364. *Samurai Commando Mission 1549* (2005) - 87 mins
aka 'Sengoku jieitai 1549' - Japanese
365. *The Sandglass* (1973) - 124 mins
aka 'The Hour-Glass Sanatorium'
aka 'Sanatorium pod klepsydra' - Polish
366. *Search for the Jewel of Polaris: Mysterious Museum* (1999) - 91 mins
367. *Second Time Around* (2002) - 99 mins
aka 'Mou han fou wut' - Cantonese and English
368. *Secret* (2007) - 101 mins
aka 'Bu neng shuo de. mi mi' - Thai, English & French

369. *The Siam Renaissance* (2004) - 141 mins
aka 'Tawipop' - Mandarin
370. *Sideral Cruises* (1942) - 95 mins
aka 'Croisières sidérales' - French
371. *Six-String Samurai* (1998) - 91 mins
372. *Siyama: Village of Warriors* (1967) - 107 mins
aka 'Siyama' - Thai
373. *Slave Girls* (1967) - 95 mins
aka 'Prehistoric Women'
374. *The Sorcerer's Apprentice* (2002) - 109 mins
375. *Smoking/No Smoking* (1993) - 298 mins (2 parts) - French
376. *Spectropia* (2006) - 103 mins
377. *The Spirit of '76* (1990) - 82 mins
378. *Star Pilot* (1990) - 82 mins
aka '2+5: Mission Hydra'
379. *Star Wreck: In the Pirkinning* (2005) - 103 mins
380. *Starcrash* (1978) - 92 mins
aka 'Female Space Invaders'
aka 'Scontri stellari oltre la terza dimensione' - English and Italian
381. *The Sticky Fingers of Time* (1997) - 90 mins
382. *Summer Time Machine Blues* (2005) - 107 mins
aka 'Samâ taimu mashin burûsu' - Japanese
383. *Teen Knight* (1998) - 90 mins
384. *Tenchi: The Movie* (1996) - 95 mins
aka 'Tenchi Muyô! In Love' - Japanese
385. *Termination Point* (2007) - 89 mins
386. *The Testament of Orpheus* (1960) - 83 mins
aka 'Le testament d'Orphée, ou ne me demandez pas pourquoi!' - French
387. *That Lady in Ermine* (1948) - 89 mins
388. *Three Days* (2001) - 120 mins
389. *The Three Stooges Meet Hercules* (1962) - 89 mins
390. *Tigerstripe Baby Is Waiting for Tarzan* (1998) - 118 mins
aka 'Tigerstreifenbaby wartet auf Tarzan' - German
391. *Time at the Top* (1999) - 96 mins

- aka 'L'ascenseur du temps' - French
392. *Time Barbarians* (1990) - 96 mins
393. *Time Chasers* (1994) - 89 mins
aka 'Tangents'
394. *Time Flies* (1944) - 88 mins
395. *The Time Machine* (1978) - 99 mins
396. *Time Runner* (1993) - 90 mins
aka 'In Exile'
397. *The Time Shifters* (1999) - 88 mins
aka 'Thrill Seekers'
398. *Time Tracers* (1997) - 101 mins
aka 'Time Chasers'
399. *Time Trackers* (1989) - 86 mins
400. *The Time Travelers* (1964) - 82 mins
aka 'Depths of the Unknown'
aka 'The Return of the Time Traveler'
401. *Time Walker* (1982) - 83 mins
aka 'Being from Another Planet'
402. *Time Warp* (1981) - 88 mins
403. *Time Under Fire* (1996) - 92 mins
aka 'Beneath the Bermuda Triangle'
404. *Timefighters in the Land of Fantasy* (1984) - 94 mins
405. *Timegate: Tales of the Saddle Tramps* (1999) - 90 mins
406. *Timemaster* (1995) - 100 mins
407. *Timerider: The Adventure of Lyle Swann* (1982) - 94 mins
408. *Timeslip* (1955) - 93 mins
aka 'The Atomic Man'
409. *Timestalkers* (1987) - 100 mins
410. *Timesweep* (1987) - 85 mins
411. *To Die (or not)* (2000) - 89 mins
aka 'Morir o no' - Catalan
412. *To the Ends of Time* (1996) - 94 mins
413. *Tomorrow I'll Wake Up and Scald Myself with Tea* (1977) - 93 mins
aka 'Zitra vstanu a oparím se cajem' - Czech

414. *The Tomorrow Man* (2001) - 95 mins
415. *Too Many Ways to Be Number One* (1997) - 90 mins
aka 'Yi ge zi tou de dan sheng' - Cantonese
416. *Total Reality* (1997) - 97 mins
417. *Trancers II* (1991) - 85 mins
aka 'Trancers II: The Return of Jack Deth'
418. *Trancers 6* (2002) - 88 mins
aka 'Trancers 6: Life After Deth'
419. *Triangle* (2009) - 99 mins
420. *Turn Back the Clock* (1989) - 91 mins
421. *The Two Worlds of Jennie Logan* (1979) - 94 mins
422. *Vampire Time Travelers* (1998) - 80 mins
423. *Virgins of Sherwood Forest* (2000) - 90 mins
424. *Voyager from the Unknown* (1982) - 91 mins
425. *Walking in Time* (1996) - 90 mins
aka 'A spasso nel tempo' - Italian
426. *Walking in Time: the adventure continues* (1997) - 88 mins
aka 'A spasso nel tempo: l'avventura continua' - Italian
427. *Warlock* (1989) - 103 mins
428. *Waxwork II: Lost in Time* (1992) - 112 mins
aka 'Space Shift: Waxwork II'
429. *W.E.I.R.D. World* (1995) - 120 mins
430. *When Time Expires* (1997) - 93 mins
431. *Wil* (2006) - 81 mins
432. *Willie McBean & His Magic Machine* (1965) - 94 mins
433. *Willows Way* (2008) - 82 mins
434. *The Winning Season* (2004) - 91 mins
435. *A Witch Without a Broom* (1967) - 86 mins
aka 'Una Bruja sin Escoba' - Spanish
436. *World Without End* (1956) - 80 mins
437. *A Wrinkle in Time* (2003) - 128 mins
438. *The Yesterday Machine* (1963) - 85 mins
439. *Yesterday's Target* (1996) - 85 mins
440. *Yor, the Hunter from the Future* (1983) - 88 mins

aka '*The World of Yor*'

aka '*Il mondo di Yor*' - Italian

441. *A Young Connecticut Yankee in King Arthur's Court* (1995) - 95 mins

442. *The Young Jacobites* (1960) - 139 mins

443. *Zardoz* (1974) - 105 mins

444. *Zathura: A Space Adventure* (2005) - 113 mins

aka '*Zathura*'

APPENDIX III: ETHICS APPROVAL

The Human Research Ethics Committee application form is followed by my letter of approval and then by the following three documents that are examples of those approved: i) oral consent script, ii) information sheet and iii) letter of approach.

Human Research Ethics Committee Application Form

Created by: **u4284384**

Record number: **2636**

Protocol type: **Expedited Ethical Review (E1)**

Protocol number: **2008/340**

Date entered: **31/07/2008**

Ethics program type: **Postgraduate**

Requested start date: **21/08/2008**

Requested end date: **31/12/2008**

Protocol title: **Models of Time**

Investigators

Name	Role	Department
Micklethwait, Guy	Primary investigator	Centre for the Public Awareness of Science, Faculty of Science, ANU
Stocklmayer, Susan	Supervisor	Centre for the Public Awareness of Science, Faculty of Science, ANU

Investigators Detailed

Name: Micklethwait, Guy **Role:** Primary investigator

Expertise: Post-Grad Course in Interviewing Techniques at the Australian Film, Television & Radio School, NSW. During the first two years of his PhD, Guy has been studying both the physics and philosophy of time. For the first stage of his research, he reviewed over 100 movies involving time travel and other temporal phenomena. For the second stage, he has chosen to use focus groups, so he attended a workshop at ANU on running them and read the book, 'Focus Groups' by Richard A. Kreuger. He is about to hold a practice focus group with his peers.

Name: Stocklmayer, Susan **Role:** Supervisor

Expertise: Dr Stocklmayer is an experienced researcher in science communication and has supervised postgraduate students for the past twelve years in this field.

External Investigators

Name	Role	Institution

Departments

Primary	Department	Faculty
Yes	Centre for the Public Awareness of Science	Faculty of Science

Project Questions Detailed

Description of Project

Describe the research project in terms easily understood by a lay reader, using simple and non-technical language.

This thesis has identified and compared different models of time used in over 100 feature films involving time travel and other temporal phenomena. For example, if time is the fourth dimension of a fixed space-time continuum, can the future be altered, or is it fixed. If the past can be changed, does this create a new future, or two parallel futures (the old one and a new one)? These different models of time are compared with the physics and the philosophy of time. The next stage is to compare these with the models of time held by the movie-going public. Several focus groups will be used for this purpose.

Location of Data Collection

Australia Yes

Overseas No

Provide country / area where data collection will be conducted.

These focus groups will be held at the Centre for the Public Awareness of Science on the ANU campus.

Aims of the Project

List the hypothesis and objectives of your research project.

To find where the models of time used by the movie-going public differ from those used in movies and in modern physics.

Methodology

In language appropriate for a lay reader, explain why the methodological approach minimises the risk to participants. (For surveys, include a justification of the sample size.)

No apparent risk with participants having a guided discussion about different models of time.

Provide the survey method, a list of the questions to be asked or an indicative sample of questions. These should give a good sense of the most intrusive/sensitive areas of questioning.

The questions that I will be asking my focus group participants are as follows:

1. Which movies you have seen which involve time travel, or other temporal phenomena?
2. Taking one movie at a time, which models of time do you feel were used in each one?
3. Does one or more of these models fit your beliefs about time and if not, which model does?

What mechanisms do the researchers intend to implement to monitor the conduct and progress of the research project? For example:

How often will the researcher be in touch with the supervisor?

Is data collection going as expected? If not, what will the researcher do?

Is the recruitment process effective?

How will the researcher monitor participants willingness to continue participation in the research project, particularly when the research is ongoing?

I work in the same office as my supervisor, so can ask for help as often as I need. Participants are only required to attend for one session, which will last approximately 60 minutes, so research with each participant is not on-going. They will be free to leave at any point during the focus group and will be reminded of this at the start and during the session.

Participants

Provide details in relation to the potential participant pool, including:

- **target participant group;**
- **identification of potential participants;**
- **initial contact method, and**
- **recruitment method.**

Target group: Each focus group will consist of ten members of the movie-going public, who have not studied the physics or the philosophy of time at a tertiary level.

Group One: I have asked the President of the ANU Toastmaster's Club if I could do a focus group with ten of their members who fit the above criteria. He has agreed to the idea in principle. I have written the attached letter to send to him to confirm this. I will provide him with a pile of my attached information sheets to hand out to his members. We have agreed a

provisional date of Thursday 21st August, directly after their weekly lunchtime meeting. I have told him that if Ethics Approval is delayed, it may need to be put back.

Group Two: I propose to follow a similar procedure with the ANU Movie club in order to gain ten of their members, who fit the criteria and would be willing to participate in my second focus group.

Group Three: A third group will only take place I do not get sufficient data from the first two and I will decide who will make up that group if and when it is needed.

Proposed number of participants. 20

Provide details as to why these participants have been chosen? They are sub-sets of the movie-going public, who have not studied the physics or philosophy of time at a tertiary level. I would expect one group to have watched a lot more movies than the other.

Cultural Considerations

What cultural or social considerations / sensitivities are relevant to the participants in this research project? There are no known considerations, or sensitivities relevant to the participants of the focus groups.

Incentives

Will participants be paid or any incentives offered? If so, provide justification and details.

A double pass to the movies for each participant in remuneration for taking up 60-90 mins of their time. This would be of value to the participants, as they will be from the 'movie-going public'.

Benefits

What are the anticipated benefits of the research? 1) The findings of this research will give valuable feedback to filmmakers, producers, directors and/or script-writers about the audience when deciding what type of scripts to use.

2) It will provide a teaching aid to academics wishing to know how much understanding the public have about the models of time, before attempting to teach them.

3) This research could be used by the authors of popular science, or sci-fi books to help them understand the different models of time the public use.

To whom will the benefits flow? 1) Filmmakers and ultimately their audience.

2) Philosophy or physics teachers and ultimately their students.

3) Authors of popular science or sci-fi books and ultimately the public who read them.

Informed Consent

Indicate how informed consent will be obtained from participants. At least one of the following boxes MUST be ticked 'Yes'.

In writing No

Return of survey or questionnaire No

Orally Yes

Other No

If Other, provide details. The oral consent will be recorded at the start of the focus group. The attached script will be used.

Confidentiality

Describe the procedures that will be adopted to ensure confidentiality during the collection phase and in the publication of results. Participants of the focus group will not be referred to by their name in my published results, but rather by a tag, such as 'Participant 1' or 'Participant 2' and therefore will not be identified in either my notes, or in the transcript of the taped session.

Data Storage Procedures

Provide an overview of the data storage procedures for the research. Include security measures and duration of storage. There will be a voice recording of each focus group made directly onto my MacBook and transcripts will be made of each session and also stored on my MacBook in a password protected file. My computer is backed up using 'Time Machine' to an external hard drive. I will keep a copy of the voice recordings and transcripts on my computer for at least five years.

Feedback

Provide details of how the results of the research will be reported / disseminated, including the appropriate provision of results to participants. If appropriate, provide details of any planned debriefing of participants. The participants will be able to read my thesis on-line when it is published. I will send them all an email telling them where and when it will be available.

Supporting Documentation

Please ensure electronic copies of any supporting documentation have been uploaded the documents tab of the relevant protocol.

Has this work been approved by another Human Research Ethics Committee (HREC)?

No

If yes, please give the name of the approving HREC.

High Risk One Summary

Question	Answer
Is this a clinical trial?	No
Does this research involve the intentional recruitment or issues involving Aboriginal and Torres Strait Islander Peoples?	No

High Risk Two Summary

Question	Answer
Does this research involve Human Genetics?	No
Does this research involve Human Stem Cells?	No
Does this research involve Women who are pregnant and the Human Foetus?	No
Does the research involve people highly dependent on medical care who may be unable to give consent?	No
Does the research involve people with a cognitive impairment, an intellectual disability or a mental illness?	No
Does this research involve an intention to study or expose or is likely to discover illegal activity?	No

Expedited Questions Summary

Question	Answer
Third Party Identification	No
Children or Young People	No
Dependent or Unequal Relationship	No
Membership of a Group, or Related Issues	No
Physical Harm	No
Psychological Harm (includes Devaluation of Personal Worth)	No
Social Harm	No
Economic Harm	No
Legal Harm	No
Covert Observation	No
Deception	No
Sensitive Personal Information	No
Overseas Research	No
Collection, use or disclosure of personal information WITHOUT the consent of the participant	No

Supporting Documentation

Please ensure electronic copies of the supporting documentation have been uploaded into the documents tab of your protocol

These may include (please circle the relevant answer):

List of indicative questions	Y/N
Copy of questionnaire / survey	Y/N
Invitation or introductory letter/s	Y/N
Publicity material (posters etc.)	Y/N
Information sheet	Y/N
Consent form	Y/N
External approval documentation	Y/N
Research visa (if applicable)	Y/N
Other (specify below)	Y/N

For other, please specify:

SIGNATURES AND UNDERTAKINGS

PROPOSER OF THE RESEARCH

I certify that all the persons listed in this protocol have been fully briefed on appropriate procedures and in particular that they have read and are familiar with the national guidelines issued by the National Health and Medical Research Council (the National Statement on Ethical Conduct in Human Research 2007).

I certify that the above is as accurate a description of my research proposal as possible and that the research will be conducted in accordance with the National Statement on Ethical Conduct in Human Research 2007. I also agree to adhere to the conditions of approval stipulated by the ANU Human Research Ethics Committee (HREC) and will cooperate with HREC monitoring requirements. I agree to notify the Committee in writing immediately of any significant departures from this protocol and will not continue the research if ethical approval is withdrawn and will comply with any special conditions required by the HREC.

Signed:.....

Date:.....

ANU SUPERVISOR

I certify that I shall provide appropriate supervision to the student to ensure that the project is undertaken in accordance with the undertakings above:

Signed:..... Date:.....

HEAD OF ANU DEPARTMENT/GROUP/CENTRE:

The Head of ANU Department/School/Centre is asked to certify that this proposal has his/her support:

I certify that:

- :- I am familiar with this project and endorse its undertakings;**
- :- the resources required to undertake this project are available; and**
- :- the investigators have the skill and expertise to undertake this project appropriately.**

Please print name and title.....

Signed:..... Date:.....

Notification of Human Ethics Approval

From: aries@anu.edu.au

Date: 18 August 2008 10:20:56 GMT+10:00

To: guy.micklethwait@anu.edu.au

Cc: Sue.Stocklmayer@anu.edu.au, human.ethics.officer@anu.edu.au

Subject: Human Ethics Protocol 2008/340

THIS IS A SYSTEM-GENERATED E-MAIL. PLEASE DO NOT REPLY. SEE BELOW FOR E-MAIL CONTACT DETAILS.

Dear Mr Guy Micklethwait,

Protocol: 2008/340

Models of Time

I am pleased to advise you that your Human Ethics protocol received approval by the Deputy Chair of the HREC on 17/08/2008.

For your information:

1. Under the NHMRC/AVCC National Statement on Ethical Conduct in Human Research we are required to follow up research that we have approved. Once a year (or sooner for short projects) we shall request a brief report on any ethical issues which may have arisen during your research or whether it proceeded according to the plan outlined in the above protocol.
2. Please notify the committee of any changes to your protocol in the course of your research, and when you complete or cease working on the project.
3. Please notify the Committee immediately if any unforeseen events occur that might affect continued ethical acceptability of the research work.
4. The validity of the current approval is five years' maximum from the date shown approved. For longer projects you are required to seek renewed approval from the Committee.

All the best with your research,

Kim

Ms Kim Tiffen
Ethics Manager
Office of Research Integrity
Research Office
Chancelry 10B
The Australian National University
ACTON ACT 0200

Oral Consent Script Read Out at Start of Focus Group

1. As explained in the info sheet, I will make an audio recording of this focus group using my computer. That way, I can listen to the recording afterwards and catch things you say that I might not fully understand during the interview, or might otherwise forget. I will not give access to the recording to anyone outside of the research team. Is it OK for me to begin the recording?
2. You have all read the information sheet about the research project, *Models of Time*. Is there anything on the information sheet that you are not clear about?
3. I will keep all the information you give me in this interview confidential, as far as the law allows. Any notes or recordings I make will be kept on a password-protected computer. I will not share your personal details, or personal views with anyone outside of my research team. Is that okay?
4. Some of the information you give me may be published. A link to any such publications will appear on the CPAS web site, the address of which is given in your information sheets. Your real name will not be used in relation to any of the information you have provided me. Is that okay?
5. You should know that even though I will avoid including identifying information in any publication, there is still a possibility that people will recognize you by the things you say, so you should avoid disclosing sensitive information, or saying anything defamatory. Is that clear?
6. You can leave this focus group at any time should you choose not to participate any further, however the contribution that you have made up to that point will not be able to be withdrawn. And if you mention anything that you do not want me to publish, please say so and I will follow your request. Is that okay?
7. Please note that confidentiality cannot be guaranteed in respect of other participants. In a focus group, you should be aware that other members of the group may recognise you and may discuss your contributions with third parties after the interview is completed. Is that clear?
8. Do you have any further questions? Can we start the focus group now?

Information Sheet Given Out Before Focus Group

FOCUS GROUP INFORMATION SHEET

Models of Time is an Australian National University research project being run at the Centre for the Public Awareness of Science (CPAS) by chief investigator, Guy Micklethwait, as part of his PhD thesis. It involves a comparative study of the models of time used by filmmakers and by the movie-going public.

If you have watched some films about time travel, or other temporal phenomena either on TV, video, DVD or at the cinema and you have not studied the physics or the philosophy of time at a tertiary level, I would like to invite you to participate in a one-off focus group discussion to get your opinions about different models of time. It should take between 60-80 minutes.

The session will be voice recorded, and the chief investigator will guide the discussion. You will be free to withdraw from the discussion at any stage should you choose not to participate any further, however the contribution that you have made up to that point will not be able to be withdrawn. Each participant will receive a double movie pass that may be redeemed at a local cinema.

You will not be personally identified in any reports that arise from the focus group. The information collected during the focus group will only be available to the research team and will be kept for five years on a password-protected computer on the ANU campus. Once the thesis has been published, you will be able to view it on-line in the 'Past Research' section of the CPAS website: <http://cpas.anu.edu>

It will take place at the beginning of November. Please contact Prof. Jean Flemming jean.flemming@otago.ac.nz at The Centre for Science Communication, Otago University, if you are interested in participating.

This research operates under the research ethics protocols of the ANU. If you have any questions, comments or concerns please contact one the following:

Guy Micklethwait
Chief Investigator, *Models of Time*
Centre for the Public Awareness of Science
Physics Building 38a
The Australian National University ACT 0200
Telephone: (02) 6125 6150; Fax: (02) 6125 8991; Email: Guy.Micklethwait@anu.edu.au

Dr Susan Stocklmayer
PhD Supervisor, *Models of Time*
Centre for the Public Awareness of Science
Physics Building 38a
The Australian National University ACT 0200
Telephone: (02) 6125 8157; Fax: (02) 6125 8991; Email: Susan.Stocklmayer@anu.edu.au

Secretary (Human Ethics Officer)
Human Research Ethics Committee
Research Office, Chancelry 10B
The Australian National University ACT 0200
Telephone: (02) 6125 7945; Fax: (02) 6125 4807; Email: Human.Ethics.Officer@anu.edu.au

Models of Time/CPAS-ANU/30Oct2008

Letter of Approach

Guy Micklethwait
Chief Investigator, *Models of Time*
Centre for the Public Awareness of Science
Physics Building 38a
The Australian National University ACT 0200
Telephone: (02) 6125 6150
Fax: (02) 6125 8991
Email: Guy.Micklethwait@anu.edu.au

Jean Flemming,
The Centre for Science Communication,
330a Great King Street, PO Box 56,
Dunedin 9054
New Zealand

October 30, 2008

Dear Jean,

Models of Time Focus Group

As part of my PhD thesis at the Centre for the Public Awareness of Science (CPAS), I am running a research project that involves a comparative study of the models of time used by filmmakers and by the movie-going public.

I would like to offer your students/colleagues the chance to participate in a focus group, which I propose will take place early next week.

Ideally, I would like to end up with between seven and ten participants, who have watched some films about time travel, or other temporal phenomena either on TV, video, DVD or at the cinema and who have not studied the physics, or the philosophy of time at a tertiary level.

The session will be voice recorded, and as the chief investigator, I will guide the discussion. Participants will be free to withdraw from the discussion at any time should they choose not to participate any further, however the contribution that they have made up to that point will not be able to be withdrawn.

They will each receive a double movie pass for attending that may be redeemed at a local cinema.

Please forward attached information sheets to anyone you think might be interested in participating.

This research operates under the research ethics protocols of the ANU. I appreciate your help in being part of this research for the ANU.

Regards,

-Guy.

APPENDIX IV:

FOCUS GROUP TRANSCRIPTS

Please note that the names of all participants have been changed to protect their identity.

Toastmasters Focus Group on 28th August 2008

Each participant's name is followed by their profession with the major of their degree in brackets:

1. Judy, Librarian/IT Support (Literary Criticism - Russian)
2. Mary, Counsellor (Social Work)
3. Glen, Business Officer (Management & Economics)
4. Rose, Museum Guide (Archaeology and Linguistics)
5. Bert, Academic in Pharmaceutical Microbiology (Biochemistry)
6. Neil, Accountant/Auditor (Economics & Accounting)
7. Tara, Agricultural Science Lab Assistant (Biology)

Assistant Moderator: Assoc. Prof. Sue Stocklmayer, PhD Supervisor (Physics)

Transcription

Key Question One

Guy: Which of these movies do you think most closely represents how time really works in life? How does time really work?

Mary: *A Christmas Carol* – I could relate to that in my life.

Judy: It would be *Slaughterhouse Five* for me. To go back and remember, and to want to change, but to re-live that.

Neil: I agree. In *Slaughterhouse Five*, you go back to your past, but it doesn't change anything about your present. All you can do is wish you had done something different in the past and wonder about how the present might have changed.

Bert: But you can do something about the future.

Mary: Well, I agree about *Slaughterhouse Five* ... I would have to say that I think a lot of things are hard to change, I really know that. On the other hand, I think you can get an epiphany like with Scrooge [the protagonist of *A Christmas Carol*] and you can change your behaviour. You can change your actions, but you may not be able to change your basic personality, but I always say that lately I have been more loving to people ... I suppose like Scrooge, I have been very self-centred and goal-orientated and obsessed with my own life, but now because I am older, I am beginning to have a more nurturing [attitude] towards my relatives and friends, realising that...

Judy: You can change the future; you are affecting the future.

Mary: I am affecting the future, but I can't change Mary in a big way ... but I can change the action. I always say, don't worry about the thoughts or the moods, but look to the actions, because they reinforce things, so that is where I am at.

Glen: I can actually see a dilemma, and the dilemma is thinking about *Slaughterhouse Five*, going back to the past, the past is always increasing, as time goes on you are getting more of it ... and the depressing thing is that the future is decreasing ... and it is just a quantitative thing that the decades are going by and you are packing more into the past. You can go back visiting at infinitum; you can spend all of the present sitting in the corner thinking about what I did in 1919. Part of human existence is that one's own personal future is decreasing every day, however, there is a future beyond that and when we depart this terrestrial existence, there might be certain things that you can do now that have an effect beyond your terrestrial existence. A simple crude example is leaving a huge legacy for some benefit, or for some worthy cause.

Neil: Or donating your body parts.

Glen: Well that's right ... and something that just popped into my mind: [people] who get themselves frozen, so they are in cryogenic tanks, with the liquid nitrogen going around ... when it is believed that there is a cure from whatever it is they died from, when there is very high assurance, they are thawed out in a systematic way and they can recommence.

Mary: I think we will overcome death ... not in my time, and that is going to be very hard for mankind to come to grips with, but yes, we will. Well, it will be optional, put it that way. [*Much laughter*]

Guy: Back to my question, is there anyone who hasn't answered which of those movies they think most closely represents how time really works?

Rose: I think *A Christmas Carol* is really closely related to what our lives are, because you can always think back to the past, but you can't change anything. Probably what you do today in the present changes your future.

Timelines

Guy: So how do these two movies differ [*Sliding Doors* and *The Butterfly Effect*] in the way that they are using time? They are both going back in time, what happens differently?

Bert: *Sliding Doors* is talking about two presents that lead to two different futures ... whereas *The Butterfly Effect* is more about going back into the past trying to change the [one] present.

Glen: So in the first one, what you are seeing are two possible presents and who knows there may be a whole series of possible presents! There may be an infinity of possible presents. As the lady is going down the stairway towards the train, any number of events might happen, she might miss the train and get onto the next train.

Mary: I wonder if we have got multiple choices in the present? You have mentioned things that happen that are obviously cause and effect; do we have that much choice really over our present?

Glen: I am inclined to think that to some extent we do have a conscious choice and the decision might be to catch the train, or not catch the train. Will I rush down the stairs and insist on getting this train, or will I wait for the next train? So there is a certain amount of conscious choice, and a certain amount of decision making that can be made.

Guy: In *Sliding Doors*, there were two nows, two different lives that were co-existing, and what about in *The Butterfly Effect*?

Bert: *Sliding Doors* was two lives that were occurring and we were getting a glimpse and they were going on. Whereas I understand *The Butterfly Effect* is where you have had your life, and then you keep going back to the past...

Judy: The fact is that the present keeps changing though, because of what you have done in the past, so your present is moving, it is changing.

Glen: But in *The Butterfly Effect*, you have got the ability to move back from the present and make and make adjustments. So you make adjustments that give you a new past up to the present. And then of course, as every day goes by, you move to a new present ... It is a bit like a computer program where you find a bug. It is sitting there - it exists. You don't like a certain thing in the code, so you go back and change the code and as happens, you make one small change and 20 other things pop out of kilter and change the program. *The Butterfly Effect* is a bit like an analogy, human life being a bit like a constructive thing, a computer program, a design. You are making adjustments to the design for better or worse.

Key Question Two

Guy: Which of these two movies [*Sliding Doors* and *The Butterfly Effect*] do you think most accurately represents how time works ... are you creating two possible parallel futures, or are you choosing one future that is creating a new future for you [replacing the old]?

Glen: I think I am attracted to *Sliding Doors*.

Tara: It [*Sliding Doors*] is simpler.

Judy: It is not really a decision, like I will rush and jam my foot into the door, so I can get on to that train. By deciding not to rush on, that is just one decision that also has all of these different repercussions. So I suppose it is a realisation that a decision will affect the course of you life. Also a realisation that life is very complex¹, so it will create maybe a totally different life.

Bert: But by making the decision, you obviously think ahead to say, 'how is this going to affect my life?' If it is something serious like choosing a partner, or a university degree, or something, then that is a serious, serious consideration that you have got to somehow project into the future.

Guy: Do you think there is another Bert somewhere else who chose a different degree and who has a different future?

¹ Interesting that this is the term used by chaos theorists to describe chaotic outcomes.

Bert: No, no, no. This is the point about making decisions is that they can affect your future, so you do think about the future when making a decision, like that woman getting onto the train...

Guy: That was more of a circumstance than a decision though, wasn't it?

Bert: Yes, it was in that film, but I think it illustrates how you can affect your own future by imagining what the future will be if you made decision A, rather than decision B.

Neil: But does that lady really make a decision? In one scenario the baby is in the way and in the second one, the baby is pulled away by the mother, so it was decisions by the baby's mother that made the difference, rather than any decision she made.

Bert: So it was a circumstance, so it is not strictly analogous to what I am saying.

Mary: It was chance.

Judy: Whereas in *The Butterfly Effect*, you are making a deliberate decision to change something.

Glen: I was thinking with *Sliding Doors* that the decision-making might not be terribly conscious, it might not be apparent: you let this train go, you catch the next train, or you gently go around the baby, might not involve any solid [decision]. You don't stand there on the step saying, 'will I go around the baby?' this is the kind of thing we are doing right through the day, in that decisions are happening in response to certain events around us. The realisation that we are making decisions is not with us. Certainly there are times when we think, 'well if I catch this train, I will be late for work and I will be in strife, so I must get this train and kick the baby out of the way.'

Bert: In that film, I don't think there was any evidence that she was thinking ahead.

Glen: It was a circumstance.

Mary: There are many circumstances.

Guy: If life could have gone this way, or could have gone that way, do you think that there is only one way that it goes, or do you think that alternatives can exist somewhere else in another universe somewhere?

Bert: Only in your imagination, but not in the real world.

Mary: I would like it to be true.

Glen: I think there is a variety of bifurcation going on, you know, ‘will I do this?’ or ‘will I do that?’ As every minute goes by, there are beginnings of various pathways that we can take. We are not conscious or realising these things, but there is some kind of infinite beginnings, the beginnings of any number of pathways, just not simply two.

Judy: You know there are some things where we play with time. In a cemetery, they have photos of the deceased on their tombstones. That person is coming back into your present and you are seeing that face and that really was a person. Or you read someone’s letters, who has been dead for decades and that person is there.

Glen: I must say with *The Butterfly Effect* ... from my viewpoint is a little unreal. It seems to me to be retro-adjusting the past to create new pasts ... and then you can come back to the present to retro-adjust the past you have just adjusted!

Neil: That’s right, because they get more facts.

Mary: You can somehow look at the past. I know lately I have been looking at my past from the eyes of other people... imagining that I am seeing it through other people’s eyes. It has helped me a lot in relating to someone that I was in conflict with and then seeing it from other people’s eyes, I started to see this person had really played a very positive part ... so I feel good about it. My adjustment to the living present has changed since through my looking at the past differently.

Judy: Well there was a rather lightweight movie about that kept going back and showing ... four or five young women ... You watched a bit of their life from the point of view of each of the women and it seemed to be totally different each view of the same event. Now that is intriguing... That suits our idea that maybe the past isn’t stable, our view of it isn’t...

Bert: The courts know this. People’s memories of the same event can be totally different.

Judy: Therefore there are parallel pasts. We have parallel [pasts] of the last Toastmasters’ meeting. We have got all different views.

Mary: People would see it differently.

Glen: Is someone's memory of the past actually the past?

Neil: It is the past according to them.

Glen: It is their interpretation of the past, isn't it?

Mary: It is quite a relief to see it from other people's point of view!

Glen: You are quite right in court cases, this is happening every day that witnesses get up and they have varying interpretations of what they heard, what they saw and what they experienced. So they are interpretations, but somewhere there has to be one single actuality or set of actualities.

Bert: You can only rely upon something that isn't as plastic as the brain for that, like video cameras, or these sort of recorders.

Glen: So you rarely get a perfect interpretation of what the past was.

Bert: From human brains yes, but from records, it is a different matter. Except historians are very selective about what they want to put down.

Guy: Also different camera angles will give different perspectives.

Glen: Even with a camera, you cut out part of the crowd and they were never there.

Summary

Guy: I think it is time to move onto the summary part now. So, going back to the four films that we looked at, correct me if I am wrong, but I think you are mostly all in agreement that the past is fixed and that we can't go back and change the actual past, we can go back and change our memory [perception] of the past. That is what you are saying. Does everyone agree?

Many participants: Yes.

Guy: Some of you think that life is more like *Slaughterhouse Five* where everything is pre-destined. Some of you think that life is more like *A Christmas Carol* where if you knew what your future would be, you could change your actions now, which would then give you a new future. Then nobody here thinks that in reality we do have parallel universes and everybody thinks that the decisions you make will give you just the one

future. The only thing that is parallel is everyone's different opinions about what has happened... Is there anything that anyone would like to add?

Neil: What about the perception that as you grow older, the present goes quicker?

Judy: Yes, it does.

Several others: Yes.

Neil: An interesting phenomenon.

Mary: That is a physiological thing.

Judy: I remember at the age of six, I was given [an advent] calendar and I marked off the days before Xmas and one day took about a year, and now you daren't look at the calendar ... Is it because when you are young, you are very observant, you observe everything and everything is new and different and now ... we are all a bit blasé about it?

Glen: When you are a small child, you are keen to grow up, because you see all of these wonderful things that you can do. That's why little kids say, 'I am four and a half and in January, I'll be five!'

Bert: I'd like to muddy the waters though by saying the future is something that we dwell on, otherwise this whole environment business wouldn't be going on. So we do dwell on the future, and it is our dwelling on what possible futures that might be which changes our behaviour in the present. So it is not all predetermined by what we do.

Neil: It is not all predetermined.

Judy: No. [*agreeing*]

Glen: No. [*agreeing*]

Judy: I don't believe that it [the future] is predetermined. Our actions affect it. I think we don't have to see the future. I don't believe I can see the future, but I do believe I can change the future by doing things now.

Mary: In the present, we can.

Glen: You can't see the future, but I think it is quite possible to imagine the future.

Bert: That is what I am saying.

Glen: You don't get into the time machine, you don't go there and get a neat presentation of what the future is, but you can imagine by reflection and by thinking and by intellect and by your own knowledge of what the future might be.

Tara: And [by] learning from the past.

Bert: Absolutely...

Glen: That is part of the knowledge that comes from the past.

Mary: ... with meditation we can expand the present, that's the great thing. I discovered that when I was in my early twenties, that for studying, you have to get into a different zone. You can sort of expand time, but that is a sort of psychological thing.

Guy: Susan, [*Assistant Moderator*] is there anything you would like to ask or add?

Sue: Yes, there is actually. I would like to ask two questions: Do you think that time travel is or might be ultimately possible, or is it just science fiction?

Bert: We do it all the time!

Sue: I mean in reality.

Tara: No, I don't!

Bert: Only in your head.

Neil: If I could ever understand Einstein's Theory of Relativity, I think it possibly could be.

Mary: I think it could too!

Bert: Well, they claim that they can teleport here at the ANU.

Mary: Yes, I know they have started that.

Judy: Yes, but that is not time, like I can just be teleported home.

Guy: It is location.

Judy: You can't teleport me into a different time zone.

Glen: What about these examples we hear about from time to time: people getting into a spaceship and travelling close to the speed of light, providing that they are not destroyed, and they can come back to the earth in the spaceship and they find that their time has been to them in just the normal fashion occurring. They get back to the earth and they find that many centuries have gone by.

Judy: I hate to confess, but my father was a science fiction writer and he wrote a popular serial that had that idea. The guy left in his early thirties, went and travelled ... came back and was still in his thirties, but everyone else...

Glen: This is theoretically possible with relativity isn't it?

Bert: It is only theory.

Glen: That is what I said: it is *theoretically* possible.

Mary: But I think it could be [possible]!

Bert: Well, if you believe the theory.

Glen: If we can get into a spaceship and travel at close to the speed of light and we are not destroyed by whatever is out there and we can come back...

Bert: That is if you believe that the speed of light is a constant.

Glen: But we are not looking ahead to see the future, we are coming back to the future ... so I don't think it is possible to look ahead to the future ... but I think it is possible to travel and come back to the future.

Neil: I would probably say so. This bit about the Hubble telescope being able to see these parts of the universe that happened a relatively short time after the big bang, that has got me interested.

Mary: In other words, is time a construct to some extent? I have always believed that it was ... In other words, we impose an idea of time ... in order to be efficient, I suppose. But ... I always think that there are a lot of things that are more constructs than are actually real, you know, age is one of them ... because we have a great social thing about it all ... It is a construct that I have come into; it is the same as sex and a whole lot of other things. These are constructs and I think time is too.

Glen: What do people around the table think about relativity though?

Tara: Do you mean as a theory?

Glen: About the possibility coming from the theory that it is possible to travel and come back in the future.

Bert: The whole theory is based upon the assumption that infinity doesn't exist ... there is no such thing as infinity in terms of time and space¹ ... Einstein's theories are all devised to accommodate the human experience that we all have time limits and that we have limits of space.

Mary: Well I am going outside Einstein's Theory.

Bert: If you go outside of Einstein's Theory and you say that there is no such thing as a limit to space or time, you can dispense with the Big Bang and all of Einstein's theories are meaningless!

Neil: I don't think Einstein's Theory covered the Big Bang, did it?

Bert: No.

Mary: But who said the mass equals energy?

Bert: Energy equals mass times a very large number, which is a constant ... Why did he take the speed of light squared as the big number for his constant?²

Neil: Well that is a huge number ... if you can't convince them, confuse them!

Sue: Is it the perception of the group that a lot of these ideas are coming from film?

Mary: I think that as consciousness is raised that films always reflect and are ahead of the time. Yes, I have always assumed that ... the ideas are coming from some collective consciousness.

Sue: So films are echoing...

¹ Not true: only some solutions to Einstein's equations require a limit to time and space such as the big bang.

² The jury is out on whether the speed of light is a constant or not. Some propose that it is slowly changing, but all agree that energy will always be proportional to mass even if the ratio slowly changes with time.

Mary: Echoing – that’s right.

Sue: What is the general feel of things? Are they picking up on current ideas and reflecting those, as opposed to learning from film? Is that the way it is for you?

Rose: I think that films pick up the current idea and bring it out and then it makes it more solid.

Mary: ... so they [films] are always a little bit ahead.

Rose: Yes ... a lot of us want to clone dinosaurs. It was really Jurassic Park that was the first to tell us that you can actually clone like that. But then, it doesn’t actually happen in real life. It is actually telling us a way, which we are thinking we can possibly [do].

Sue: So they [films] represent possibility. So when you are watching a film that has time travel, or parallel universes, or whatever, are you sitting there thinking it’s just science fiction, or are you thinking this could be how it is?

Bert: I am thinking it is all a load of bullshit!

Tara: I think it is science fiction; I can enjoy it, but don’t think it is real.

Neil: You can ponder on it, but you really think, ‘it is only fiction,’ but you think in the back of your mind, ‘perhaps it could happen.’

Judy: I think it is more psychological. It is talking to me psychologically. It is talking to me about humanity and everyone’s desire, real desire to stop time, to go back, to change.

Neil: That’s right, we would all like to do that. To go back and change things.

Judy: We all like to do that. It is making us feel better about it. If we could change, we could have all of these incredible ... we would be changing so many other things that we wouldn’t like. So it is comfort food in a way. It is talking to us about our mind and how to adjust and be comfortable the fact that we can’t change [the past], but that we could change the future.

Glen: I think what we see shown in film, a lot of it comes from human collective consciousness and it affects human desires that we may or may not express, that how wonderful it would be to go forward in time or go back and make the adjustments. I

wouldn't say that I learn anything from films like that, but I take them on board as possibilities and sometimes very interesting possibilities.

Judy: With sliding doors, it made me feel like I mustn't be bitter or regret having missed the train, because having missed the train gave me the best outcome, so you don't regret certain things.

Glen: You get a very enduring story like *A Christmas Carol* and I think that really reflects a deep human desire. That is why the story lives on in people's minds and I find it very optimistic to be able to have that glimpse, or some ghost to take me somewhere and see what might happen. That is a real motivator that I can do something when I wake or when the ghost goes away and I can set things right and I can develop a more beneficial future.

Bert: Getting back to your question, I don't believe that it is part of the collective consciousness at all. I think it is the imagination of one individual. We all have imaginations, which are based on our life experiences and an extension of that. So, the modern science fiction films are no different to Grimm's fairy tales ... The imagination of Grimm working on his experiences if you like creating these images, which were then put down on to paper instead of film, which is what we do these days.

Sue: So if someone raises the theory of relativity, as support for their idea, is that equally fantastic for you?

Tara: It is for me ... I don't understand the theory of relativity.

Neil: I think I did raise it, but said that I didn't fully understand it.

Tara: You could explain it to me equally well by some other tribe's legend as by the theory of relativity.

Sue: So how do you see time, as a line along which you are travelling? Would that be fair?

Tara: Yes.

Several participants: That would be fair.

Sue: And there is no other line?

Several participants: No.

Sue: Only in theory, but not in practice ... and you can't cross lines in reality.

Neil: We would all like to cross them.

Glen: I don't see it as a line. There is a linear interpretation, but I don't think other possibilities are impossible and relativity is one such [possibility] ... I think that is a possibility that can't be discounted.

Glen: The whole concept of time and speed and distance are human constructs so we don't go mad. It is to keep us sane, there is no reason to my mind why these couldn't be totally variable.

Sue: Do you think as a group that this reflection process that you eluded to is changing your ideas about how time works? Have you modified your ideas about time as time has gone by ... or do you think you have always thought about time this way?

Bert: Well, I think there are really two questions: one is, 'what do we use for practical living purposes?' So we have time with watches and so on. And then time as a concept is another matter and that is where the philosophers get going and then they play with words and equations and things and they are in their own little world then. Who knows what time really is, other than the practical need to have some definition of time so we can organise our lives. But in terms of the age of the universe, or the speed of light, who knows?

Mary: Because as we change, as our perceptions change, so will all these concepts, because we will evolve and change. We have to.

Neil: Maybe most of us will live to the time when man will land on Mars.

Mary: Oh definitely!

Neil: It is going to be interesting that the time that they think they have taken to get to Mars and back and the time that actually elapses [on Earth will be different]. That is going to be very interesting.

Mary: These are all things that I wish we could be around to see.

Glen: Are we allowed to create a plot for a film? I am imagining this luxury space ship. It has all the mod cons on board. It has wonderful things and we can move very close to the speed of light and providing that we are brave enough and that we are confident enough, and that the space ship will survive and that we will survive in it and we might not be too worried about going off for X number of years and coming back, not too worried about what we might find here, it could be the greatest human adventure.

Bert: You get very heavy, if you believe Einstein.

Glen: But heavy relative to what? It is just a local heaviness isn't it? We are not being compared with someone over there in the next spaceship, who is travelling slower. It is local heaviness, so there is no need to worry ... So we need a bit of adventure!

[At this point, we had been going for an hour and a half, so I brought the focus group to a close.]

Physics Focus Group on 30th October 2008

Each participant's name is followed by their profession with the major of their degree in brackets:

1. Will, PhD student in Quantum Optics Group (Physics)
2. Eric, PhD student in General Relativity Group (Physics)
3. Mark, PhD student in General Relativity Group (Physics)
4. Luke, Post-doctoral Fellow in General Relativity Group (Physics)
5. Paul, Honours student studying General Relativity (Physics)
6. Joel, Physics Outreach Officer (Physics)
7. Ross, Software Engineer (Physics)
8. Nick, Masters student in Science Communication (Physics)
9. Andy, Software Engineer (Civil Engineering and Physics)

Assistant Moderator: Prof. John Raynor, Thesis Advisor (Physics)

Transcription

Models of Time

Guy: How was time treated differently in *Terminator 3*?

Luke: It was treated as something inevitable that you couldn't change ... In [*Terminator*] 1 and 2 you could actually affect the future by changing the past... In number three, it was inevitable: no matter what you do, time may take a different path, but it will...

Will: Convergence of timelines.

Guy: Exactly, so in this movie, you could change the past, but you couldn't change the future.

Eric: Ah, so that is why you have chosen the different ones [films], they are different models of time.

Guy: Yes.

Eric: You've got the trousers of time kind of effect where you can get different timelines. You have got convergence. Are you going to throw Harry Potter [and the

Prisoner of Azkaban] in there, because that was a really good one with closed time-like curves?

Key Question One

Guy: Which of these four movies do you think most closely represents how time really works for you?

Luke: It depends which philosophical hat you are wearing at the time.

Guy: Which one most closely represents your most commonly held belief about life and time?

Nick: We have to assume we can change our future, or there would be no point in making a decision ever! So from a purely practical point of view, we have got to assume that now will have some bearing on what happen in the future.

Will: To keep yourself sane you mean?

Luke: Or you just don't think about it!

Mark: It is like a matter of fate, you can't change anything that will be.

Nick: Even if it isn't true, you've got to assume that it is, because otherwise you couldn't live your life.

Joel: There is no point.

Will: Some people believe in destiny.

Luke: I knew you were going to say that! [*Laughter*]

Eric: There is a difference between determinism and predictability. Just because the universe is deterministic, doesn't mean that you can predict it."

Luke: That is true.

Joel: The other idea is the 'Many Worlds Theory': you make a decision, the universe splits and you live in both universes.

Luke: I've always found that fuzzy.

Guy: We are going to talk about that [Many Worlds] in the next section, so let's stick with this question ... We will go around the room.

Will: I'd go with the *Back to the Future [Part II]* model, [open past, open future] because it is going to mostly strongly correlate with the Many Worlds Theory that when you change things it is going to create a new path, because I don't like the idea of fate basically.

Eric: Fixed past, fixed future. I believe that if there would be any time travel, that you would end up forming something like closed time-like curves, and the things you are going to go back and change are already part of the past that leads to a future where you go back, so things stabilise, so there is no chance of changing anything that has happened. And I believe that everything that plays out in the future, are deterministic but not predictable, so the interactions that are leading to the future are too many and too varied to ever predict. At the same time, there is no real free choice; no one ever has real free choice.

Guy: So it is like Chaos Theory. If you knew all the variables you could predict the future, but there are too many.

Eric: Yeah. With physical theories, as in quantum there may be actual real random events in the universe, but I don't believe that anyone can actually direct the future with free will.

Nick: I am not sure that we can really know whether the future is changeable or not, I just think we have to assume that it is. We have to assume that our actions have consequences, or we would never take any actions, so I am going to go with the future being changeable. Thinking about the past being changeable, it raises the question of how you would know, because if you go back into the past and change something, the change you made becomes what had already happened, so you might not even be able to detect it, because it would be in the history books that you read as a child that the change you made had already happened.

Luke: If you are asking personal views, I really feel quite agnostic about what the real essence of time is, but I think I agree with Eric that basically we have very limited free will, if any actual free will ... I guess it is a good game to play that you either have some kind of predictable consequence, otherwise I think for instance society would go

quite badly if you just thought it was all up to fate ... because you can do anything you like ... It would actually basically lead to a very quick death if you didn't think that your own decisions had any consequences.

Guy: That is what the masses think, but I am asking what you think ... and you may think that the masses should think that in order to keep that in order, but I what do you think?

Luke: I guess what I am saying is that I don't really know what to think. I basically just go about my day doing things as if that is the way it works, but the actual essence of time, I really couldn't say. I am quite interested in like what determines the rate of time for example, because it is a lot to do with our perception of time interacting with the actual physical nature of time. So things like entropy really quite interest me and the arrow of time being determined by less or more probable events occurring.

Joel: I agree with Luke in that I don't have a real strong opinion of whether [the timeline] is fixed or not, but I have some small inkling towards the Many Worlds Theory. In that case, I would say that the future is open. My particular path up to now is not changeable, but there are probably infinite paths that I could have taken in the past and they may exist in other universes, so I would say my own past is not changeable, but it is possible to change the past of a version of me and the future is open.

Paul: I would say that I believe the future is open in terms of cause and effect. What I do now will affect what happens later on, but there is nothing saying that I have to do something now, such that something happens later on ... I suppose the future is open and it all branches out, so from any instant in time there are so many different futures depending on what you choose to do at that time. So, I suppose I like the idea of a certain amount of free will that you aren't just railroaded into a definite future. But as to changing the past ... I agree with what you were saying that if you do go back and change the past, you change what has already happened, so therefore you haven't changed anything! If you could take a totally external view, you probably have changed something, but as far as anybody else is concerned, you have done nothing. So in practice you can't [change the past].

Mark: It doesn't make sense that the newspaper would slowly fade to the new timeline. With relativity, I am inclined to take the 'everything is fixed' point of view. In the unlikely event that we can time travel, it might be possible to find out that you are your

own grandfather, but not to prevent your conception, not to change anything. I don't know how that fits with the Many Worlds Theory. Presumably something like this: a foliation and there are heaps of such different timelines, but they all have that property of nothing changing, so there is no inconsistency in any of the possible future timelines. The whole free will thing: I don't think that is such a problem, because you don't know what the future is going to be, so it doesn't really matter if you are pre-destined to live it, which is kind of like an attitude Christians have had for a long time: that God predestines everything, but that doesn't mean that you don't have to behave in a good way.

Ross: I kind of think of it in terms of like the timeline that we experience, so even though there might have been different timelines branching out everywhere, in terms of what we are experiencing, it feels like we have a fixed past, but a changeable future, just because that future is the one we are experiencing and that is the timeline we are on.

Guy: You are saying that we are experiencing the 'Click' model [fixed past, open future] ... but my question is ... that is how you experience time, but do you think time really works like that?

Ross: Yes, I think I am leaning towards that.

Andy: I basically come from the fixed path variable future model, but I want to qualify it in two ways. One is our perceptions of what happened in the past aren't necessarily what actually happened, because we systematically re-write history and often actions now are based on what you thought happened not what actually happened. The second one is the future, again, I think that we are to some extent locked in, because past actions have future consequences, and so although in theory free will gives you room to move; in fact your free will is quite limited, because of past events and actions.

Joel: You don't necessarily have to have an open future or past to have free will: you can think of it as you through your life is creating your life, but outside of time that is what you did in your life and that's fixed.

Guy: In Terminator 3, they had free will, but couldn't change their future. They had room to move ... In the second model, they still had free will, there was just some converging pre-destined future where everything comes together.

Andy: My feeling of free will is that you only have a limited range of choices within where you are at, who you are ... so that it is not open, it is just highly constrained simply because of what sort of beast you are.

Nick: It is interesting because of what you are talking with things converging doesn't necessarily rule out the parallel worlds idea, in that I am thinking if we assume that an infinite number of things could happen in this room now, one of us gets up and does a dance on the table, hopefully it is not going to happen, but actually as soon as we walk outside, the fact that someone danced on the table is irrelevant. No matter which one of us it was and no matter what bizarre thing happened in here, it is not going to affect the outside world and all those timelines can just converge again. There might be another place where those things diverge again, which could make a huge difference, but most divergences won't.

Timelines

Guy: Let's move onto the second part of the discussion, which is about parallel worlds.

Eric: Just one thing about Many Worlds Theory, it doesn't play very strongly into any discussion on time, so if you posit that all possibilities happen somewhere, each individual universe still has to have its own timeline and its own model of cause and effect.

Luke: Not necessarily. You could have different models of time in different universes. Many Universes is really just a big grab bag of different...

Eric: No, then you are going into the idea that you have got many universes where all of the different constants could be different in each one, not that each one just splits from single choices... I am just talking about is the one where every possible choice is a splitting of universes, where the universes are identical in terms of their laws.

Andy: The interesting thing to me is if there is interaction between those worlds.

Luke: If there is an over-arching trajectory of all those worlds.

Guy: The next thing I want to talk about is *Sliding Doors*. [I give a brief summary of the movie and finish by talking about how the girl ends up with the same guy in both worlds, but in one world she dies.] Any comments?

Andy: It seems like they can't make up their mind whether to convergent or divergent.

Luke: It is a good filmic device because you can explore all the sort of ‘what if’ possibilities. For example, what if it was slightly different and what if the butterfly didn’t flap his wings?

Guy: How is this [*The Butterfly Effect*] different to *Sliding Doors*? ... When she goes back in time, we have discussed this, the universe branches at this point and a second branch is created that runs in parallel with the first branch. But what happens when this guy goes back in time in *The Butterfly Effect*?

Luke: He has got more control over what happens.

Eric: It is changing a single branch. It is reworking it.

Will: It ceases to exist.

Andy: In fact, he wants it to collapse – that is the whole point!

Guy: So this film wouldn’t work if it was parallel universes, because by going back, he would just be creating another branch and he wouldn’t be fixing it.

Luke: Yes, it wouldn’t matter what he did.

Key Question Two

Guy: If backwards time travel was possible, do you think you would be changing the original timeline, or do you think you would be creating another one?

Joel: I strongly believe that you would be creating another one.

Will: Yeah.

Joel: It doesn’t seem to make sense! Changing one timeline just means that it is the same timeline anyway and it is not changed, because it is what you did anyway.

Luke: If it made sense, it would be very complicated.

Andy: I don’t think we have any evidence for whether it would be one or the other.

Luke: It really is belief.

Guy: Unless you can get the parallel worlds to reconverge, you will never know.

Luke: Physicists are quite attached to causality, because it allows us to make predictions ... We have had a lot of success using equations with causality, so we are very attached to it.

Guy: Let's just go around the room with a very quick response from everyone.

Will: The *Sliding Doors* [timeline] if travel into the past is possible, then I think that things have to split up.

Eric: I can't rule out the *Sliding Doors* kind of possibility of alternate timelines existing, but then you have to look at each individual one. I believe each individual one is in itself a fixed single timeline. If you could go backwards and actually have time travel, everything would stabilise in the sense that everything you did in the past would lead to the future ... That would be self-consistent, no changing like you had in *The Butterfly Effect*. You couldn't just completely alter the timeline and somehow have memory of everything.

Nick: I think it comes down to a question of what you can detect. If it is a single timeline and you go back and change it, I don't think you can ever detect that because it is what was there all along. So if it is a multiple timeline, if you can go back and make a change and that causes the universe to split, then the only way you would know is if your memories are different from everybody else's, which suggests you have gone back down one leg of the trousers and gone forward up the other one.

Guy: So you have this photograph that changes? [*I don't believe it would.*]

Nick: You would never see it happen, it would always have just been the photograph.

Guy: You would have to have a memory of the photo?

Nick: If it was a single timeline, that is right, you could never detect it ... It is an interesting thing: if you have got the photo that has travelled back with you, then the photo would be the same as your memory wouldn't it? So if you can detect it, then there must be multiple universes!

Eric: All of that ends up relying on some sort of sense of being outside of the timeline when it changes ... Has anyone seen the 'direct to DVD' movies they have been doing of *Stargate* since they finished it? ... *Stargate Continuum* [2008] came out only a few months ago and they have time travel ... [Does] anyone watch *Stargate*?

[Silence]

Eric: Very basic premise of the movie is that Baal gets his hands on a time machine and goes back and changes everything. When he changes it and activates it, they happen to be in a wormhole at the point the [timeline of the] universe changes, so they have a memory of the old timeline and can then try to fix everything back up.

Guy: Have any of you see the movie *Frequency* [2000]? They don't time travel, but they can communicate with the past ... and as the past changes, the future corrects itself.

Luke: Perception is quite an amazing thing. We constantly rewrite history. Eyewitness accounts of accidents are quite fallible, because you can just about be convinced of anything! So I think time can get away with a lot of discrepancies and our perception would actually cope with the changes.

Guy: So you are saying if you went back and changed something, but you remembered something different, how would you know your memory was accurate?

Luke: That's right – perception can be pretty tricky!

Guy: Joel, you agree with parallel worlds?

Joel: Yes, but I was thinking that if there are parallel universes, then you must really assume that there is an infinite possibility of happenings at every moment. The universe splits into every single possibility at every moment in time. So if you did travel back in time, then that would already be encompassed, because that is one of the timelines that would already exist ... So it is not that you are going back in time and changing the timeline, you are going back, which is what you are destined to do to enter that universe anyway.

Luke: But there may be a universe where you actually did destroy the causal structure and there may be ones where it is all self-consistent.

Eric: We are quick to confuse everything that you can think of with everything that is possible.

Luke: That is the thing about Many Worlds is that you can't prove or disprove it, so it is just a philosophical viewpoint. So what you can conceive of may be possible, or may

not, but in terms of possibility, we have no way of measuring it, so we don't really know what is possible.

Guy: Let's assume that all the parallel worlds have the same laws of physics. There would be a sub-set that did ... We are talking about this world with these constants splitting at a point after the Big Bang. I am asking if we went back along this timeline a year or so, what would happen.

Joel: That's the thing: so we are going back along our current timeline, but we are going back to a point and at that point where we come back, this is when we are saying that the universe splits into these ways affected by coming back, but as you took that path initially, your universe split off, and then you are going back and altering say a number of other paths, but it is not necessarily the case that it hasn't already happened and that you were already destined to go back and create those branches or whatever.

Nick: In the general idea of the Butterfly Effect, they say a tiny change can change everything, but most of them don't. There is one tiny change every now and then that has a huge effect, so you could go back and you could live your entire life in the past and not muck about with anything significant.

Joel: There is a probability based on the amount of the effect you have, so if you do something tiny, then there is a small probability that it changes things.

Nick: If you do something tiny at just the right point, but the chances of you doing something at just the right point are actually quite small.

Luke: Yes, the right conditions.

Nick: You would have to wait for the right butterfly to pass.

Guy: OK, Paul, what do you think? *Sliding Doors* or *The Butterfly Effect*? If you went back, do you think you would replace the old branch, or create a new one along side the old one?

Paul: I honestly don't know. Is it actually worth drawing a distinction between the two? I am confusing myself here, because when you go back, you change something ... if it immediately diverges then, in that case you would still have an idea that you have changed something ... no, that kind of contradicts what I said before, so I reckon no, you can't change it, it won't diverge off. So I suppose that is *The Butterfly Effect* option.

Nick: If we are assuming the parallel universes idea and we are saying that if you go back and you change something ... [Both outcomes] must have both existed any way, so you haven't actually changed anything. Your perception is that you have gone back down one channel and up the other, but in the greater scheme of things, you haven't changed anything, as they both already existed!

Guy: If you truly believed in parallel worlds, you would never go back to change something...

Nick: Unless you wanted to make your own future ... if you could choose your own branch.

Paul: If I buy a Lotto ticket and lose, I would like to go back and try and find the branch where I won!

Guy: So you could experience a different branch ... Mark?

Mark: Based on parallel worlds, it seems like, *Sliding Doors* is better in that both trouser legs are experienced, rather than being able to choose which one you would rather experience, which is more what *The Butterfly Effect* seems to be. So that is not really time travel then either. Thinking about it in that sense doesn't really mean that it is really time travel per se, rather than parallel universes.

Guy: Some magic took her back in time and showed her what would have happened.

Luke: Well it is not showing her, it is showing us, the viewer.

Eric: That's right it does, because she has no concept that [her world has split].

Mark: On the other hand, if you believe that only the present exists, and there is a present arrangement of molecules and there is no past or future, then you would be more inclined to believe in *The Butterfly Effect* because you would think that maybe you could preserve some region of the present and then cause everything else to reverse its direction and then wait for a while, then turn that effect off. That way you would have some volume of the universe would effectively go back in time and you would be able to carry your newspaper with you and it wouldn't change, it would show an alternate timeline.

Guy: So which one are you going for?

Mark: Well that wouldn't sit with relativity, so it would make sense a century ago if you were writing science fiction, but I don't think it works now. So I would go with *Sliding Doors* now, but I don't think it is time travel.

Ross: I am inclined to go with the *Sliding Doors* model.

Andy: I want to differ from everybody, because ... I am uncomfortable with both. I am uncomfortable with the parallel universes one, because there are going to be too many of them. I am uncomfortable with going back and changing something, because that doesn't fit with my fixed past model ... A science fiction story that I read ages ago ... which is about somebody going back, trying to change events, and he can't as this whole thing is happening, which prevents any change, so it is a molasses sort of effect.

Guy: The Novikov Self-Consistency Conjecture, where he says that if you were to go back in time, there would be laws of physics that would stop you. If you tried to kill someone, the gun would misfire ... to keep the whole world self-consistent ... so if we are talking about time loops and self-consistency, it means you can go back, yes, but if you did go back, you wouldn't be able to do anything that would stop you going back and creating a paradox.

Joel: It is so contrived ... The universe can't know your intentions about what you were going to do and in some way stop you.

Will: That is provided you think you have free will, which I agree with.

Paul: How can the universe make you do something different without changing itself and causing it to be different in the first place?

Guy: Because then it would not be consistent ... there might be a law of physics or a law of the universe that says the universe must be self-consistent. For example in any of the Terminator movies, if they stopped the machines taking over, those robots would never have been made and be able to come back to stop it. So for the story to be self-consistent, Terminator 3 has to be right. You are not making up destiny as you are going along...

Joel: That is inconsistent, because you have got this information that has appeared out of nowhere.

Eric: And even with that information, the future ends up happening.

Andy: The way I am thinking about it is how far can a change propagate ... in time? So you get into this historical inevitability scenario where yes, you make a change here, but it makes no difference down the track.

Luke: If Leibniz hadn't existed we would still have calculus!

Will: Somebody foreseeably could just choose to fire a nuclear bomb at some point or not and that is obviously going to impact.

Andy: But how long will it have an impact for?

Guy: I think Novikov would say it could happen for any length of time up until the point that that the universe becomes non-self-consistent. It couldn't go past that point.

Nick: We are talking about a nuclear bomb, it is one of those things that someone might decide to do, but they wouldn't just decide to do it out of the blue. So if the person is fated to do it in one timeline and they don't, the chances are that would cause someone else to do it.

Andy: Well I would take it at a higher level. This is back to the historical inevitability thing, where you are saying in effect that it doesn't really matter that this guy did it, because somebody else would have done something similar, which would have the same consequences at the time, because it is the social situation, not the individual.

Nick: Calculus is a good example...

Andy: Well that is the argument: was it Newton or was it Leibniz?

Nick: Exactly if it hadn't been one of them, it would have been the other, if it hadn't been either of them, somebody else would have done it!

Summary

John: A couple of general comments: There seems to be around the group quite a difference if you are talking about your sort of very own personal feelings ... of the nature of perception and that sort of thing, as again when you are dealing with ... the generalities, or the physics of things, then things are a little more detached from you as individual people. So one of the things I have found interesting is this difference, reflected even in the way that people are interacting around the table. It seems that when people are talking about personal matters, you tended to be a little more this way and

when you are talking about matters of generality that there is much more sort of looking around and so on, ... So how comfortable we are when we get down to absolutely personal opinions is one of the things that I have found interesting.

Luke: Personal viewpoints have been changing along the way from the absolute level ... the mechanical universe idea and determinism and the classic idea of a single equation to describe the world, that's when people really did think in absolute terms. We have kind of moved on from that way of thinking and that does actually make it harder to attach yourself to your beliefs about what you think actually occurs in the universe. You think about measurement and you think about how floored some measurements can be. So in principle that gives us a bit of uncertainty about how we interact with the rest of the world.

Eric: Uncertainty, but not directability. We still haven't escaped from the whole deterministic kind of viewpoint of how everything moves along one thing from the other ... You spoke about the time when they thought that the universe was clockwork and mechanical. How have we left that except for introducing theories, which introduce chance.

Will: Because we that at the core it is not deterministic, like the macroscopic law or whatever it is.

Eric: Yes, in order to escape from determinism, you have to actually inject some actual theory of free will, where you can actually have directability of the universe and its future and we haven't come up with anything like that so far!

Luke: What John is talking about is our own views about how we personally think about the universe.

Eric: I think about the universe in terms of physics.

John: Another question that I have is that when you view one of these films that involve time travel, do you continue to think in terms of the reasonableness of the physics or of the actual models of what is going on or are you prepared to in a sense accept whatever premise is there and then just go along for the ride.

Luke: The whole point of film is that they set up a structure at the start, a logical structure, and basically you believe whatever game they set up. So you believe in cartoons, as long as it is cartoons from the start.

Paul: No matter how ridiculous it gets, as long as it is self-consistent, you are happy.

Joel: It is a little bit annoying when they just get it wrong.

Everyone: Yes [*or agreeing tones.*]

Nick: The difference between wrong and what is We are changing this and it is going to be consistent though the whole novel, or film, or whatever it is and it is based on this premise that this is now the new consistency, rather than just, 'Oh well, we can think about it, so we will just magic it.

Luke: Yes, a bit insulting.

John: You could imagine a film, which one deliberately broke the law of conservation of energy, and having taken that as the initial premise, you could develop something that was self-consistent within that model. Would we as physicists find that offensive or would we go along with something like that?

Will: It depends how it is done. If they explained it right from the start ... We can believe in magic and all that, we can suspend disbelief, but if for some reason, the structure is set up and then we went, hang on, we have just disobeyed the law of conservation of energy and it wasn't explained at all...

John: The same as the time one here. As somebody said, if they plainly got it wrong, you would find that off-putting, but clearly wrong and self-consistent and yet still feel satisfied ...

Andy: To me, the breaking of the rules is where the fun is! What is interesting about all this, is saying it is a 'what if' if you like, 'if we can so this. If you look at it, all of the science fiction, which is about inter-stellar travel and all this sort of thing, you know it is bullshit, but who cares!

Luke: It is self-consistent bullshit though.

Nick: That is the whole point - you just live with it. The time travel thing is very much the same thing, you just say, 'Well if we could travel in time, what would be the consequences?' and you enjoy it!

Guy: I have one other question that I didn't ask the previous group, because it is something I am working on that I would like to get your opinions on. We have talked about how you might have free will to talk change some things, but not other things. In the movie, *Déjà Vu* ... when he goes back in the past, he is able to change things, he finds he finds he is not changing the future because the ferry still explodes, as he is trying to stop the ferry exploding. Then he realises that if he actually makes a big enough change, then he can change the future, so a different outcome will happen and the ferry won't explode, which leads me to think about Chaos Theory, where you have these attractors, strange attractors, where you can move across enough lines, you will end up whipping across onto the other loop. Any comments about that?

Luke: I think as Nick pointed out, you really need the right conditions [for it] to be chaotic ... For example, as humans, we only have only a certain amount of capacity for energy so we can't push mountains aside and things like that. So conditions really need to be set up in an unstable equilibrium basically. So we need a marble at the top of the hill.

Joel: You mention being at the right time, because you get the change you need to make varies in time as well. So at some point in time, there might be a tiny little change that you need to make, and at some point, it gets bigger and bigger the change that you need to make.

Dunedin Focus Group on 4th November 2008

The names of the participant are followed by the major of their degree and then by their profession:

Gary, IT Support in Zoology (Computer Sci)

Hans, Lawyer (Political Science)

Beth, Teaching Fellow in Anatomy (Biology)

Phil, Research Assistant in Zoology (Biology)

Alan, Masters student of Film (Biology)

Ruby, Marketing (Chemistry)

Lisa, Housewife (Media Studies & Film)

Jose, Lab Technician in Zoology (no degree)

Assistant Moderator: Jean Flemming, Professor of Science Communication (Biology)

Transcription

Key Question One

Guy: Which of these movies do you think most closely represents how time works?

How does time really work?

Phil: Open-open. If everything is predetermined, then you might as well say that nothing out there now is going to affect anything in the future, because nothing I have done in the past has affected the future.

Alan: Fixed-open, because I think things that have already happened, you can't change, where it is nice to think that things that are going to happen in the future you have got some influence over, otherwise what is the point of making decisions now if things that are going to happen are going to happen.

Beth: Can I have one of each? You can change your opinion of the past, which can affect your future ... I don't know how to explain it. I guess it is like learning from the past, so you can change your future.

Guy: So that is like the 'Click' model?

Beth: Yeah ... but I guess it is open to interpretation because you may glean some information that sheds a different light that ends up changing the whole situation for you.

Guy: So your perception is changed, but do you think this will physically change things in the future?

Beth: It is just a feeling I have. I think there are some things that through changing your own opinion maybe will alter your choices in the future.

Lisa: Probably fixed past, but I like your idea that your perception definitely can change, and I think the future, yeah, wide open. Anything could happen; it just depends on how you play it.

Ruby: Open future and I think it is open past ... I think that is how I want it to be ... I don't know why ... but I think that the future has got to be open ... I think that if you are in control of this moment now, and you were to go back, you would be in control of that moment, so it has to be open.

Phil: You are saying the same things as I do. So if you were to go back now, it would be like being in the present, but in the past. So by saying it would have no impact is like saying that anything I do now would have no impact. So if I go back tomorrow and I burn down the Zoology Department, when I go outside, it is not going to be there. How can it be there when I have burned it down yesterday?

Lisa: So you were saying that if you were to go back into the past and make changes, then that is still only affecting the future from that point on.

Phil: But depends on whether you can go back and only look at the past ... or whether you can actually participate in the past. Only if you can participate will you be able to change anything.

Beth: Arnold Swarzenegger's *Eraser* [1996], although it wasn't time travel, the tagline for the movie was, 'He will erase your past to protect your future.' So there is a certain element of ... if you are not attached to your past, then it is not going to influence your future.

Phil: That would be a perception thing too. Using past experience to influence the way you act in the present, which is going to influence the future.

Gary: I would say fixed-open. It is just that because if it is open-open and you go back and change it, then the present that is supposed to be the future of the past wouldn't be happening. It is just getting a bit confusing ... if you have regrets in the present and you decide to go to the past, if you can, and change it, then the regrets won't be there and therefore you wouldn't go back to change it - it is an infinite loop going on ... by going back, then you change your past, then supposedly, you won't be going back.

Key Question Two

Guy: Which of these four movies do you think most closely represents how time really works: *Sliding Doors* with branching timelines, *The Butterfly Effect* with just the one timeline that you can change, *Terminator 3* with the converging timelines, or *Déjà Vu* where you can change time [destiny], but only if you make a really big change to the past? Any comments?

Hans: I think I would say *Déjà Vu*: the big change where something will always happen, well mostly, if you make a big enough change...

Phil: I also like the idea that if I went back in time and I walked left out of this door instead of right, some whole thing can change, some significant actions could be able to change.

Hans: It depends on how big the event you are talking about is.

Guy: Well, if you think of *Back to the Future* [Part 1], where he went back and met his parents and because he had met them, they weren't going to get married any more. He became really worried that that was going to become a significant enough event to stop him from being born, so he was trying to get them back together again. So that follows this model [*Déjà Vu*] as well.

Lisa: You know, very small currents can actually have a very big impact ultimately, so...

Phil: I think it also depends when...

Hans: You can drop a stone in and it makes ripples across a lake...

Alan: The 'Butterfly Effect' is the mathematician's chaos theory, it is like where you only need to make a small change to cause a huge change in the future, by just going

back and changing something small, I like that idea that changing something small could have knock on effects in the future and the future could be completely different.

Guy: The thing with the Chaos Theory and the Butterfly Effect is that the flap of a butterfly's wing could cause a tornado on the other side of the world, but equally it may not, you just don't know. Whereas *The Butterfly Effect* movie, when every time he changed something, it definitely had consequences.

Beth: But then he was deliberately trying to change something significant, he was going for the big change...

Alan: And it would be a very boring film, if you changed it and nothing happened.

Beth: I think I would go for the *Terminator 3* 'All roads lead to Rome' one, but with significant change as one of the options. [*So really she means she is going for the Double Well option!*]

Alan: Maybe the scary thing thinking about that one *Terminator 3* is that if she can go back in time and change something, but nothing is going to change in the future, does that mean that if we now change something, that our future is going to be the same? If you believe in the *Terminator 3* one, it almost makes you think that you can't affect things in your own life.

Beth: You can change the way you get there.

Ruby: The problem I have with that one is what defines what is the rope bit at the end.

Guy: Well you are all destined to die!

Ruby: Yes, we are all going to die, but in *Terminator 3*, it is like the machines are going to take over and that is the event. So what triggers that to be the event? Why is it going to lead to there and not to something before? And then after that is there something else? I think it works in the film because that is the point where the time travel starts, so that triggers that being the point - they want to keep it consistent.

Guy: *Terminator 4* could have an open future ...

Beth: After that point?

Guy: Exactly! The future was only fixed to that point because otherwise you would get an inconsistency. So that guy that came back in time, that had to happen, but past that it might be open.

Hans: So the moment someone goes back in time, it stops [the future being changed] ... So it makes you wonder why they go back!

Beth: So they can have more fun along the way!

Guy: Do any of you believe in parallel universes?

Hans: That is the *Sliding Doors* one, because if you have *Sliding Doors*, then every single decision that anyone makes, creates a different timeline, and you just end up with these infinite timelines.

Gary: At any point there could be a parallel timeline.

Ruby: I think it is quite fundamental from a parallel choice that you think I am this person and I am me and for you to exist somewhere else and be you as well is quite difficult to deal with. It is easier to go with the 'I can change what happened' when there is a single line, but it is quite hard to believe that there is a whole other version of you.

Guy: Let me just clarify this, we don't have any parallel universe advocates in this room?

Ruby: I prefer the parallels, but I can't see ... hopping between them. You can go backwards and forwards from where you are. [*Didn't she say before that it was hard to believe that there were other versions of herself?*]

Round The Table

Guy: I would like to go around the room one by one, if you can just tell me ... which of the first models you are going for, and the second models. So you can either say the name of the film [that represents] the model like *Back to the Future [Part II]*, or you can say 'open-open'.

Alan: Is this the model we like most, or the model that we believe to be true?

Guy: How do you think time really works? How do you think the structure of time is, the nature of time?

Gary: I reckon the *Sliding Doors* one, because you can have infinite possibilities at any given time ... Closed-open.

Hans: Closed-open. Double well. [*Déjà Vu*].

Beth: Closed-open. *Terminator 3*, with double well [*Which really is Déjà Vu*].

Phil: Open-open. *The Butterfly Effect* [diverging].

Alan: Closed-open. *The Butterfly Effect* [diverging only from this point onwards].

Ruby: Open-open. *Sliding Doors* [parallel timeline]

Lisa: Closed-open. *The Butterfly Effect* [diverging only from this point onwards].

Jose: Closed-open. *Sliding Doors*, but with the more significant worldly occurrences probably *Terminator 3* [a diverging parallel timeline that can converge back].

Guy: So even if you created a parallel universe, you would still end up with the same destiny in that parallel universe?

Jose: Yes, for significant events. [*This is another type of timeline*]

Alan: What do you define as a significant event? For some people, having jam on their toast rather than butter is a significant thing!

Hans: But will that affect other people further on?

Guy: There was a war which begun in *Gulliver's Travels* over an argument about whether a soft-boiled egg should be cracked from the little or the big end!

Time Loops

Guy: Any comments about time loops?

Beth: They make great stories!

Phil: Is that kind of like the Adolf Hitler example, where actually what happened was she thought, 'I'll go back and change this,' but what caused it in the first place was the person going back and changing it anyway. So, it is the chicken and the egg really isn't it?

Ruby: It fits with the *Déjà Vu* version doesn't it, where it is all predetermined, so this has to happen in the future to allow this to happen in the past.

Guy: So do you think that a time loop could happen?

Everyone: [*Silence.*]

Guy: If it was consistent or not ... or maybe never because time always goes in a straight line. I am not talking about going back in a time machine; I am talking about time itself bending right around in a loop.

Phil: Time [from the perspective of] the person is not looping, to the person itself, it is just linear, like in *Groundhog Day*.

Guy: If you are an ant walking along this piece of paper and I bend this paper [right] around, the ant will think he is still walking in a straight line, but will end up where he started. So yes, to the person, it feels just like he is going along his dimension as normal.

Beth: In *The Time Traveller's Wife* story, which is a quite popular book [film coming out next year in 2009] there is one person [the wife] that is going from A to B, and there is another person [the husband] who is going from A to B who just hops in and out, so the book follows a normal kind of timeline. He gets older, but appears in her life at different times, he is older at some times and younger at others... I guess it is two different people, so somebody could be on the loop, so he is on a loop in her life, but she is not.

Alan: Is it actually looping for everyone, [but] only one person is aware of it? ... He has a concept of time, so can look at a paper and realise that it is 1940, whereas everyone else...

Summary

Jean: As a non-film goer and a non-physicist, I have found this intriguing and I have found that you have all challenged my belief systems in terms of time. You have all grabbed these notions of open and closed and the timelines ... and yet some of you have been quite strong ... and quite determined in saying well 'I like this model, but I like this model and actually they contradict each other,' and I really like that, because it shows the possibilities that the [pathways of the] neurons in here [the brain] reflect the

[type of] timeline [chosen] as well. So from the point of view of a biologist, it has been fascinating to see how your brains work ... A lot of you have actually moved in your initial positions and have thought of some comments that Beth made earlier, that made [you] think and go in a different direction ... My only question is that I have no idea how time works in reality, and I would really like to know if any of you have any idea about what the reality of time is.

Lisa: One of the freakiest things in my life: I had a brain injury, I had a growth that disappeared, but during that time of brain injury, time was the thing that got the most bizarre. It expanded and contracted at will and was just like so difficult and distracting and it was at about that time that I saw the movie, *Memento* so wow ... but literally, I would be lying there in the bed and there would be a clock at the end of the room and five minutes felt like an hour and vice versa. I think the secondary thing was space, as I also had medical staff coming in and asking me my name and things like that and they would ask me where I was and as days went by, I felt myself getting further and further south, strangely.

Guy: Did time ever stop for you?

Lisa: It didn't stop, it just got really, really slow, or strangely quick.

Alan: A lot of Hollywood movies are like that. In *Twelve Monkeys*, at the end of it, you are left thinking was this all just a figment of the guy's imagination, who was suffering from mental condition.

Lisa: Well believe me, that can totally happen!

Phil: Time just seems like it is just a perception thing.

Everyone: Yeah!

Phil: Yes, because if you are busy or you are drunk, time goes quite differently!

Beth: What you were saying about head injuries: well I actually died and was pronounced dead for about four and a half minutes! And there were just some weird things that every now and then I remember from that time, but when I first regained consciousness, it was bizarre the concept of time.

Lisa: What did you experience, like when you were saying it was bizarre, what...

Beth: There was just this concept that time didn't exist. There was no sense that there was any time or past. [*It was the same for me when I came out of my coma, but I didn't tell them about that!*]

Guy: That is what I was trying to ask you [Lisa] when I said did time stop. I didn't mean, 'Did it stop?' I meant, 'Did it just cease to exist?'

Lisa: Not for me, but for you [Beth], it did.

Beth: Like neurologically, Jean touched on it before, what is happening with our neurons? Are they giving us the perception of time? Is that how we think and do other animals and primates have the similar concepts that we do of time?

Alan: How about some people say that time goes faster as you get older, is it true?

Jean: Yes!

Phil: If you are child and you are five, one year is actually one fifth of your life, so your perception of one year is a lot longer compared to a year when you are 35 or something like that.

Beth: Do you remember when you were at school and you had a two-week break and it seemed like forever! Nowadays when you have a two-week holiday, when it is over, you say, 'I need two more!'

Everyone: Yeah!

Dunedin Interview on 4th November 2008

Sean has no formal degree (pending). He currently teaches Short Film (Structure and Discipline) at a high school. He does professional voice for radio, short film and visual effects design and production, and owns a postproduction suite for DV/HDV. He is an accomplished studio and live mix engineer, with more than a decade of broadcast radio behind him. He has presented a TV series and worked as a sound operator.

Transcription

Intro Questions

Guy: How often do you watch a movie and is it usually on TV, rented, streamed, or at a cinema?

Sean: I watch between eight and ten films per week and sources vary from rentals to locally made productions: a wide variety of sources.

Guy: Can you remember watching any movies that involved time travel or other temporal phenomena and which ones were your favourites and why?

Sean: I remember many of them. Labels may be a little lucid, but the ‘why’ was always significant and that was the ability to manipulate the corridor of time by perception of our corridor of time ... or by changing a single significant, or insignificant events. There was a film [pictured] on your poster, *Sliding Doors*, how a single insignificant event can completely alter the corridor of time. Those are the sorts of films that have had a significant impact on my life. Well’s *Time Machine* was always a grand favourite of mine, I remember reading the book as a boy and being absorbed by this corridor of time and the multiplicity of time. That was a favourite subject of mine.

Guy: Any other films that immediately spring to mind?

Sean: *The Butterfly Effect* was a particularly good one. I liked the psychological impression of time manipulation with one of the Schwarzenegger films, *Total Recall*, where time itself is being replaced by memory. That is fascinating. The idea that I don’t remember being there, but I have evidence to be here, or I was here, but have no memory of being here. The juxtaposition of time as being a corridor, but of also being entirely plastic – that is very interesting too.

Models of Time

Guy: So, now we are going to focus on four specific films ... What I would like you to do is just give a quick summary of the film if you have seen it [in relation to] how the past and the future are treated differently, or not as the case may be. So, *Back to the Future Part II*, do you remember which film that was?

Sean: ... that was a particularly interesting ... Future knowledge adjusts everything about that principle of time. If we have foreknowledge, then time itself ceases to be such a discovery and then becomes manipulable, like what would I do, how much would I pay for next week's Lotto numbers? That is absolutely fascinating and the manner in which it is presented ... The question again?

Guy: A summary of how the past and future are treated.

Sean: The future is treated as being plastic, being entirely manipulable by seemingly ordinary events: sports events, the single winning or losing of a particular team, which may or may not have any direct influence on any individual's life, has the ability at that point (particularly within the film) to recreate society.

Guy: I've always wondered how valid those results would be once you start screwing with the past.

Sean: Well this is the multiplicity of universality, which is as soon as you change the time carriage within one stream, you split it, but we are very conflicted as to whether it is duplicated, replicated or dissolved...

Guy: The next movie is *Terminator 3: Rise of the Machines*, do you remember how that was different from the first two?

Sean: It is an absolute inevitability: the paradox of 'because I exist, therefore whatever you do will not change my existence,' it is that whole paradox thing of 'if I go back and kill my grandfather'. Not a particularly new vehicle, but I think its interpretation in terms of filmmaking was particularly well used by [the director].

Guy: I think a lot of fans didn't like [T3] as much as [T2], because it took away the free will and destiny to stop the machines.

Sean: I remember 'The Making of' [documentary on the T2 DVD] showing the film to preview audiences with the car headlights swinging [side to side] across the painted

white line was a powerful psychological mechanism: there is this possibility of free will, this freedom of choice within the body of time still existed, but in [T3] it was removed that the Judgement Day came. Its time and date was purely specific, which I liked because it gave a finite resolution, it was a finite hook for that story. Whether or not it was a justifiable mechanism within time manipulation, I am ambivalent about.

Guy: In the first two movies, it was a big paradox, because if you stopped the machines from taking over, then how on earth did the terminators come back to stop them.

Sean: Exactly!

Guy: And in the third one, at least it was self-consistent.

Sean: It was a closed story. This was not just a possibility, not just an extreme possibility within T2, but in T3, it was a reality, then it was just a matter of: How far is this reality going to go? What can be done? What needs to be done in order to maintain the existing flow of time? So the boundaries became very constricted.

Guy: So what could we say about the past and the future and how they were different in this movie?

Sean: In this particular film, it is a corridor and it is brick by brick. It is an inevitability that even though I may wish to do something to change an event, future or past, it is an inevitability, because it has already happened upon itself.

Guy: So the distant future is unchangeable?

Sean: According to the T3 model, yes.

Guy: And in this model, the past is changeable, but all paths...

Sean: All paths lead to Rome, yes. You may wish to turn left or right at Oak Street, but ultimately you are going to end up at work.

Guy: The third movie is Click with Adam Sandler ... it is a modern day version of *A Christmas Carol* ... [*We talk about the plot.*]

Sean: It is a character story, with a time machine, or a time mechanism for the allegory of my higher self views me and provides me with opportunities.

Guy: So, it is a little bit different from the first two?

Sean: Very different in that it is self-important, it is tremendously personal and personal stories are possibly the most difficult to get across, in terms of character and character arc. To make them believable, the remote control ... is a machine that provides images of self. I would like to have one myself. I would like to go back and be able to hit reverse shuttle and say, "OK, at this moment, you should not go out with this girl" and then fast-forward to see the results of that event.

Guy: But in this movie, he couldn't change anything, he could only see what he had done...

Sean: Observer only ... I think human memory uses time as a fixed point of reference indiscriminately and certainly with a very poor body of accuracy. The most wonderful moments last for hours and the things we want to forget, we do our best to compress, or at least nullify, or remove colour.

Guy: And if you interview a group of people about an event, they will all have very different versions of what happened.

Sean: Precisely, every diamond has multiple facets. The human interface is so malleable and prone to self-suffocation. We don't want to believe this, but there it is.

Guy: The fourth movie is ... *Slaughterhouse Five*.

Sean: I read the book and saw the film a very long time ago now, at the very early stages of my film watching.

[*There was a short discussion about the plot of the film.*]

Guy: We have this thing as humans that after we die, that is the end of our life and that is final and that is bad.

Sean: It is a very western viewpoint certainly!

Guy: It is not bad, because it is not the last chapter. The chapters are all jumbled up and he can do them over and over again in any order.

Sean: Yes, like any playing deck, it is the cards that you are dealt and in this case, they are his own cards and they are out of order...

Guy: So how does that compare to the other three movies in terms of fixed and open time?

Sean: Well, time is fixed, but the ... structure is open. It is still brick by brick, the mechanism of time as being a sequence of events that is unchangeable, but within this particular structure, the events are not changeable, but their structure is. That in itself provides opportunities for observation, which we have addressed in the two previous films, which makes me think of *The Time Travellers Wife*¹, a modern novel of someone who is chronologically challenged, who will suddenly drop out of so-called real time and appear at another point in time and space completely beyond their control ... *Slaughterhouse Five* is observational ...

Guy: The interesting thing in that movie is that at some point he gets abducted by aliens and is taken to a planet, where time doesn't exist, so he is completely 'out of time' ... and he says, "When can I leave here and go back?" and they say, "What do you mean, when? You are here now, you have always been here and you always will be here! Time just doesn't exist on this planet."

Sean: The fourth dimension and the fifth and sixth and so on are so foreign to us. Speaking to film students in terms of three dimensions, many of them cannot grasp the dimension of zed, (forwards and backwards). They can grasp the reality of two dimensions, but if you factor in the fourth dimension, many of them are completely incapable of understanding how time can be manipulated. I understand that. In western philosophy, there is birth, adolescence, adulthood and death. I have more of an eastern philosophy that time may or may not be circular, that the process of learning and re-learning a lesson over and over again is an opportunity and the past life process is more than just a little real. To have moments out of time, when time dilated or compressed, completely compressed, so that two hours felt as if it was two months. There may be a point outside of the fourth dimension, or within the fifth dimension. I am going off on a tangent here!

Guy: When I have finished my PhD, I would like to take [this research] into the psychology of time and look at Buddhist monks and how time collapses for them and everything becomes one.

¹ The book has been made into a Hollywood movie, which is due to be released in early 2009.

Sean: Yes, moments of absolute stillness, of pure unity, where there is no body of time.

Key Question One

Guy: My key question here is: which of these four movies do you think most closely represents how time really works?

Sean: Bear with me while I contemplate. [*Long pause, while he considers the question.*] History is written by the victors and perception of human time is incredibly brief ... I wonder if the moment of now is purely a focussed lens of all history and all future, as if the lens is floating along a ruler that which is behind us, even that defines linear time. If time is a corridor and this moment of 'now' is a compressed lens of existence (this moment that we share here and now) which by definition is repeatable because it is being recorded, I think that the future and the past are both open and the single (I hate this phrase) 'nowness', this instant moment is only concrete while we are able to perceive it.

Guy: Do you think everyone's perception might be different, or the same?

Sean: I think that there are multiple perceptions of time.

Guy: So if there are multiple perceptions, do you think that 'now' could be different for every person?

Sean: Absolutely, and in fact even [with] just the brief physical difference between you and I, our perceptions will be different. They must be different. The people in the building opposite us, somebody must be having a completely separate experience of time: how is suddenly dilating, or is massively compressing. I work to deadline often, in fact, I find that I work best to deadline and I find that it allows me to find a moment within the future that I know that I must complete, I must arrive at that moment, but on Sunday afternoon my wife and I had absolutely nothing to do and the afternoon lasted forever. It was an absolutely magical afternoon, where 4 o'clock seemed to come and stay for many hours. So, I think that the individual human psychological appearance, or recognition of time is truly malleable.

Guy: There are two questions here: There is the personal perception of time and what is really happening with time.

Sean: Chronological time is measured by the atomic clock and then there is the human interface with that.

Timelines

Guy: So let's go with your answer of the malleable past and future and move on to the next section where we are going to focus on four other films. This is assuming that you can go backwards in time, what happens when you get there?

[Discussion about the plots of the four movies and the types of timeline used in each.]

Sean

[*Déjà Vu*] is a different story vehicle than *Sliding Doors*, which is really just a simple mechanism to say, 'OK, let's have two parallel stories.' I like the double-well mechanism.

Key Question Two

Guy: So my question to you is out of those four models: the *Sliding Doors* one where [the timelines] branch; *The Butterfly Effect*, where the original [timeline] collapses; *Terminator 3*, where they branch, but can converge again, or *Déjà Vu* with the double well, which of those do you think would most closely represent what would happen if you were to go back in time?

Sean: [Long pause, while he considers the question.] I will go for the orthogonal theory, that a new timeline will be created, a new structure.

Guy: In parallel to the old one?

Sean: No, orthogonal, like *The Butterfly Effect*. I would opt for that. It is purely a personal thing, but as a filmmaker, I would want to engage them all ... but I am going for *The Butterfly Effect* and I am actually surprised that that would be my choice.

Guy: So then you would be fighting with paradoxes.

Sean: Yes, I would be. I would find myself in a position of I have manipulated my time strand and I would therefore need to be responsible for that manipulation. I am actually very surprised ... pleasantly!

Summary

Guy: So, let us summarise here, in the beginning, you have gone for the *Back to the Future Part II* model where time is malleable in the past and the future and in the second half, you have gone for *The Butterfly Effect*, which are complementary...

Sean: ... if I had that time machine, I would go back and if it was observational, I would like to be able to take my consciousness with me and the wisdom of this time with me...

Guy: I have always wondered about that because in the movies, they always take their consciousness back with them, but in reality, would it always go with you?

Sean: Exactly, nice question. If I were to time travel, would I just go back to time being a linear constant, or would it be a non-linear constant, and I would take my consciousness back to that moment. I would like to put a wise head on my young shoulders. That is truly fascinating, because there are so many things within my life where I would definitely make changes, which would put me in a completely different place, which means that I would never be having this conversation with you! The great casserole of time, or the flux of time – very interesting and the parallelism of time, I have to question whether I believe in the infinite value of all things, when I am placed in a question like this. The parallelism, the multiplicity of the universe that everything is infinite, that there is an infinite and instant supply of everything including time, permits me to say that, yes, there will be multiple channels of time, like there are multiple radio stations broadcasting into this room right now (at least 20 radio stations), but I am only able to perceive at this moment none of them - because I do not have the mechanism, I do not have the perception of it. As a science fiction reader, half a second out of phase of this time, there is another time strand existing, where creatures or beings from that time strand are able to perceive and manipulate us. So, time is not only a relativistic event, but also a very useful vehicle for story writing ... the multiplicity of time: you have got me thinking – I'll be reading a lot now!

Guy: Is there anything else you would like to add for the tape before I switch it off?

Sean: You have given me a lot to think about... What are the things I would change, if time were a linear constant and I could shuttle backwards and forwards?

APPENDIX V: SYNTHESIS RESULTS

Table 21 shows the revised model of time that was used in each of the 132 films reviewed. An asterisk denotes the films that were reviewed in addition to the original study.

	Film Title (Year)	Past-future rule	Timeline	
			Property	Type
1	<i>Five Days to Midnight</i> (2004) *	Open-open	Double Well	Replacement
2	<i>Alien</i> (1979) *	Undefined	Undefined	Undefined
3	<i>Aliens</i> (1986) *	Undefined	Undefined	Undefined
4	<i>Alien³</i> (1992) *	Undefined	Undefined	Undefined
5	<i>Army of Darkness</i> (1992)	Open-open	Converging	Replacement
6	<i>Arthur's Quest</i> (1999) *	Open-open	Diverging	Replacement
7	<i>Austin Powers: International Man of Mystery</i> (1997)	Undefined	Undefined	Undefined
8	<i>Austin Powers: The Spy Who Shagged Me</i> (1999)	Open-open	Converging	Replacement
9	<i>Austin Powers in Goldmember</i> (2002)	Open-open	Converging	Replacement
10	<i>Back To The Future</i> (1985)	Open-open	Double Well	Replacement
11	<i>Back To The Future Part II</i> (1989)	Open-open	Double Well	Replacement
12	<i>Back To The Future Part III</i> (1990)	Open-open	Double Well	Replacement
13	<i>Beneath the Planet of the Apes</i> (1970) *	Undefined	Undefined	Undefined
14	<i>Bewitched</i> (2005) *	Open-open	Diverging	Replacement
15	<i>Biggles</i> (1986) aka 'Biggles: Adventures in Time'	Closed-closed	Fixed	Replacement
16	<i>Bill & Ted's Excellent Adventure</i> (1989)	Closed-closed	Fixed	Replacement
17	<i>Bill & Ted's Bogus Journey</i> (1991)	Open-open	Double Well	Replacement
18	<i>Black Knight</i> (2001)	Open-open	Converging	Replacement
19	<i>Brigadoon</i> (1954) *	Open-open	Diverging	Replacement
20	<i>The Butterfly Effect</i> (2004)	Open-open	Double Well	Replacement
21	<i>The Butterfly Effect 2</i> (2006)	Open-open	Diverging	Replacement
22	<i>The Butterfly Effect 3: Revelations</i> (2009) *	Open-open	Diverging	Replacement
23	<i>Cashback</i> (2006)	Closed-open	Diverging	Replacement
24	<i>Chiller</i> (1985) *	Undefined	Undefined	Undefined
25	<i>A Christmas Carol</i> (2004)	Closed-open	Diverging	Replacement
26	<i>Click</i> (2006)	Closed-open	Diverging	Replacement

27	<i>Clockstoppers</i> (2002)	Undefined-open	Diverging	Replacement
28	<i>Close Encounters of the Third Kind</i> (1977) *	Undefined	Undefined	Undefined
29	<i>A Connecticut Yankee In King Arthur's Court</i> (1949)	Open-open	Converging	Replacement
30	<i>Contact</i> (1997)	Open-open	Diverging	Replacement
31	<i>Cube 2: Hypercube</i> (2002) *	Closed-closed	Multiple	Parallel
32	<i>Daleks' Invasion Earth: 2150 A.D.</i> (1966)	Open-open	Diverging	Replacement
33	<i>Déjà Vu</i> (2006)	Open-open	Double Well	Replacement
34	<i>Demolition Man</i> (1993)	Undefined	Undefined	Undefined
35	<i>The Devil's Arithmetic</i> (1999)	Closed-closed	Fixed	Replacement
36	<i>Doctor Who</i> (1996) aka 'Doctor Who: The Movie'	Open-open	Double Well	Replacement
37	<i>Donnie Darko</i> (2001)	Open-open	Diverging	Replacement
38	<i>Dr Plonk</i> (2007)	Undefined-open	Converging	Replacement
39	<i>Durango Kids</i> (1999)	Open-open	Double Well	Replacement
40	<i>Evil Dead 2</i> (1987) aka 'Evil Dead 2: Dead by Dawn'	Closed-closed	Fixed	Replacement
41	<i>Family Guy Presents Stewie Griffin: The Untold Story</i> (2005)	Open-open	Double Well	Replacement
42	<i>The Family Man</i> (2000)	Undefined-open	Diverging	Parallel
43	<i>The Final Countdown</i> (1980)	Open-open	Converging	Replacement
44	<i>Flight Of The Navigator</i> (1986)	Undefined-open	Diverging	Replacement
45	<i>The Forbidden Kingdom</i> (2008)	Open-open	Converging	Replacement
46	<i>Forever Young</i> (1992)	Undefined-open		
47	<i>Freejack</i> (1992)	Undefined-open	Double Well	Replacement
48	<i>Frequency</i> (2000)	Open-open	Diverging	Replacement
49	<i>Future Cops</i> (1993) *	Closed-closed	Fixed	Replacement
50	<i>Galaxy Quest</i> (1999)	Open-open	Diverging	Replacement
51	<i>The Girl Who Leapt Through Time</i> (2006) aka 'Toki o kakeru shôjo'	Open-open	Diverging	Replacement
52	<i>Groundhog Day</i> (1993)	Open- closed	Diverging	Replacement
53	<i>Harry Potter and the Prisoner of Azkaban</i> (2004)	Closed-closed	Fixed	Replacement
54	<i>Idiocracy</i> (2006)	Undefined-open		
55	<i>If Only</i> (2004)	Open-open	Double Well	Replacement
56	<i>If Only...</i> aka 'The Man with Rain in His Shoes' (1998)	Open-open	Diverging	Replacement
57	<i>It's a Wonderful Life</i> (1946)	Undefined-open	Diverging	Parallel
58	<i>The Jacket</i> (2005)	Undefined-open	Double Well	Replacement
59	<i>Journey to the Center of Time</i> (1967)	Open-open	Diverging	Parallel
60	<i>Jubilee</i> (1977)	Undefined	Undefined	Undefined
61	<i>Jumanji</i> (1995) *	Open-open	Diverging	Replacement

62	<i>Just Visiting</i> (2001)	Open-open	Diverging	Replacement
63	<i>Kate and Leopold</i> (2001)	Closed-closed	Fixed	Replacement
64	<i>The Kid</i> (2000)	Open-open	Diverging	Replacement
65	<i>A Kid in King Arthur's Court</i> (1995)	Open-open	Converging	Replacement
66	<i>The Lake House</i> (2006)	Open-open	Diverging	Replacement
67	<i>Land of the Lost</i> (2009) *	Undefined	Undefined	Undefined
68	<i>Lara Croft: Tomb Raider</i> (2001) *	Open-open	Diverging	Replacement
69	<i>The Last Day of Summer</i> (2007) *	Open-closed	Converging	Replacement
70	<i>The Love Letter</i> (1998) *	Open-open	Diverging	Replacement
71	<i>The Last Mimzy</i> (2007)	Open-open	Converging	Replacement
72	<i>Lost Horizon</i> (1937)	Undefined-open	Diverging	Replacement
73	<i>Lost In Space</i> (1998)	Open-open	Diverging	Replacement
74	<i>A Matter of Life and Death</i> (1946) aka 'Stairway to Heaven'	Undefined-open	Diverging	Replacement
75	<i>Me MyselI</i> (1999)	Undefined-open	Parallel	Replacement
76	<i>Meet the Robinsons</i> (2007)	Open-open	Double Well	Replacement
77	<i>Minority Report</i> (2002) *	Undefined-open	Diverging	Replacement
78	<i>The Navigator: A Mediaeval Odyssey</i> (1988)	Undefined-open	Diverging	Replacement
79	<i>Next</i> (2007) *	Undefined-open	Diverging	Replacement
80	<i>The One</i> (2001)	Undefined-open	Multiple	Parallel
81	<i>Past Perfect</i> (1996) *	Open-open	Converging	Replacement
82	<i>Paycheck</i> (2003) *	Undefined	Undefined	Undefined
83	<i>Peggy Sue Got Married</i> (1986)	Open-open	Converging	Replacement
84	<i>The Philadelphia Experiment</i> (1984)	Undefined-open	Converging	Replacement
85	<i>Philadelphia Experiment II</i> (1993)	Open-open	Diverging	Replacement
86	<i>Pirates of the Plain</i> (1999) *	Undefined	Undefined	Undefined
87	<i>Planet of the Apes</i> (1968)	Undefined	Undefined	Undefined
88	<i>Planet of the Apes</i> (2001)	Open-open	Diverging	Replacement
89	<i>Playing Beatie Bow</i> (1986)	Open-open	Converging	Replacement
90	<i>Premonition</i> (2007)	Closed-open	Double Well	Replacement
91	<i>The Promise</i> (2005) *	Closed-open	Diverging	Replacement
92	<i>Retroactive</i> (1997)	Open-open	Diverging	Replacement
93	<i>Returner</i> aka 'Ritana' (2002)	Open-open	Diverging	Replacement
94	<i>Run Lola Run</i> (1998) aka 'Lola Renn'	Open-open	Diverging	Replacement
95	<i>The Seeker: The Dark Is Rising</i> (2007) *	Open-closed	Converging	Replacement
96	<i>Slaughterhouse Five</i> (1972)	Closed-closed	Fixed	Parallel
97	<i>Sleeper</i> (1973)	Undefined	Undefined	Undefined
98	<i>Sliding Doors</i> (1998)	Open-open	Diverging	Parallel
99	<i>Slipstream</i> (2005)	Open-open	Diverging	Replacement

100	<i>Somewhere In Time</i> (1980)	Closed-closed	Fixed	Replacement
101	<i>A Sound of Thunder</i> (2005)	Open-open	Double Well	Replacement
102	<i>Southland Tales</i> (2006) *	Open-open	Converging	Replacement
103	<i>The Spaceman and King Arthur</i> aka ' <i>Unidentified Flying Oddball</i> ' (1979)	Open-open	Converging	Replacement
104	<i>Sphere</i> (1998)	Open-open	Double Well	Replacement
105	<i>Star Trek</i> (2009) *	Open-open	Diverging	Replacement
106	<i>Star Trek IV: The Voyage Home</i> (1986)	Open-open	Converging	Replacement
107	<i>Star Trek: First Contact</i> (1996)	Open-open	Double Well	Replacement
108	<i>Star Trek: Generations</i> (1994)	Open-open	Double Well	Replacement
109	<i>Stargate: Continuum</i> (2008)	Open-open	Diverging	Replacement
110	<i>Suddenly 30</i> (1995) aka ' <i>13 Going on 30</i> '	Undefined-open	Diverging	Replacement
111	<i>Superman</i> (1978)	Open-open	Diverging	Replacement
112	<i>Teenage Mutant Ninja Turtles III</i> (1993)	Open-open	Converging	Replacement
113	<i>The Terminator</i> (1984)	Open-open	Diverging	Replacement
114	<i>Terminator 2: Judgement Day</i> (1991)	Open-open	Diverging	Replacement
115	<i>Terminator 3: Rise of the Machines</i> (2003)	Open-closed	Converging	Replacement
116	<i>Time After Time</i> (1979)	Undefined-open	Converging	Replacement
117	<i>Time Bandits</i> (1989)	Closed-closed	Fixed	Replacement
118	<i>Time Changer</i> (2002)	Undefined-open	Double Well	Replacement
119	<i>The Time Guardian</i> (1987)	Open-open	Converging	Replacement
120	<i>The Time Machine</i> (1960)	Closed-closed	Fixed	Replacement
121	<i>The Time Machine</i> (2002)	Open-open	Converging	Replacement
122	<i>The Time Traveler's Wife</i> (2009) *	Closed-closed	Fixed	Replacement
123	<i>Timecop</i> (1994)	Open-open	Double Well	Replacement
124	<i>Timecop 2: The Berlin Decision</i> (2006) *	Open-open	Diverging	Replacement
125	<i>Timecrimes</i> (2007) *	Closed-closed	Fixed	Replacement
126	<i>Timeline</i> (2003)	Open-open	Converging	Replacement
127	<i>TimeQuest</i> (2002)	Open-open	Diverging	Replacement
128	<i>Timescape</i> (1992) aka ' <i>Grand Tour: Disaster in Time</i> '	Open-open	Double Well	Replacement
129	<i>Tom's Midnight Garden</i> (1999) *	Closed-closed	Fixed	Replacement
130	<i>Twelve Monkeys</i> (1995)	Closed-closed	Fixed	Replacement
131	<i>Twilight Zone: The Movie</i> (1983) *	Open-open	Converging	Replacement
132	<i>Vanilla Sky</i> (2001)	Undefined	Undefined	Undefined

Table 21: The full data set of 132 films showing their model of time