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Loyola Marymount University
University Honors
Program

Representations of Time in Time-Based Media:
An Exploration of the Human Experience of
Temporality in Film and TV

A thesis submitted in partial satisfaction
of the requirements of the University Honors Program
of Loyola Marymount University

by

Nelea Fong

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Abstract

Time is an aspect of the human experience that fascinates us but eludes our understanding. Humans have turned to science, philosophy, and theology in our endeavor to understand time, but our shared love and history of storytelling drives us to explore temporality through visual medias that have a structural foundation in time. Expanding our understanding of the human experience of time through time-based media such as movies and TV can point us toward comprehending various forms of time and how each person can perceive said time differently. Using film and TV theory, informed by scientific and philosophical explorations in the study of time, I analyzed the narrative and formal elements in five film and TV texts to investigate the ways they use time to explore how humans experience something as complex and ineffable as time. Although time-based medias can only be consumed linearly, each of the texts engages with the concept of time presented nonlinearly through methods such as narrative, editing, and visual design to illustrate multiple possible experiences of time to the audience. These visual media texts, as time-based objects, work to communicate various human experiences and explorations of time through their unique narrative and formal elements, thereby expanding our knowledge of time as a scientific, philosophical, and aesthetic construct and demonstrating the power of time-based media.

Introduction

Time is a phenomenon both measured and felt, exact and completely subjective, existing everywhere and nowhere. These contradictions drive our natural curiosity to seek answers about time and the way it extends across the universe. We have explored time in a vast number of ways, from philosophy to science to poetry to art, in an effort to better understand the phenomenon of temporality and the ways in which we experience it.

Film and television have an inherent advantage in exploring time, as they are time-based medias that rely on a set duration to express a narrative. When the narrative itself contains an element of time, especially a non-conventional temporal structure, the visual forms of film and television such as color, cinematography, and editing can be used to influence audience perception of time and express the experience of a particular model of time. While the more traditional medias are linear in storytelling, the use of nonlinear storytelling through these forms results in a broadening of comprehension of complex temporality. Media such as film and television not only offers the ability to display non-serial time, but possesses the ability to convey multiple models of time at once through various narratives.

In this paper, five time-based texts are examined to determine the ways in which multiple modalities of time can be expressed in a single text and what visual forms accompany the narrative to do so. These texts, *Interstellar* (2014), *Doctor Who* (2005-present), *Your Name* (2016), *Arrival* (2016), and *Dark* (2017-2020), each engage in nonlinear storytelling. Through the analysis of the methods of storytelling and the accompanying narratives, these texts can reveal the key to exploring unconventional models of time in time-based medias and conveying the widely variable human experience of temporality to a receptive audience.

Relative Temporality: The Nonexistence of Now

The film *Interstellar*, following father and space pilot Cooper as he embarks on a journey through space and time to rescue the human race, but more importantly, see his family again, not only presents multiple facets of the human experience of time but demonstrates how lived experience of time takes priority over the time represented and measured by a clock. Jimena Canales describes in her article “Clock/Lived” that films remain an important piece of exploring time and human experience, as “scholars have focused on filmic time to better understand the relation between temporality and technology” (Canales 124). The manner in which a film presents temporality greatly affects the audience’s perception of time, both in the watching of the film and in the concepts the film introduces through its forms.

In *Interstellar*’s case, the film rests its entire narrative stakes on the character’s lived experiences of time, intertwining the scientific concepts of time that the film explores with the protagonist Cooper’s main goal: to see his daughter again. Within the film, Cooper lives through time differently than his daughter on Earth due to the natural properties of spacetime and gravitational waves, thus, his body feels and represents time differently. According to Canales, “lived time” is a term that is “attached to living beings, salient moments, and a sense of indeterminacy and heterogeneity” (Canales 117), rather than the strict accuracy of measurement produced by machinery like clocks. Although detailed accuracy of measuring time plays a role in the film, the temporality experienced by the characters is shown to be widely variant and tied closely to the affect it has on the character, indicating said “salient moments” mentioned by Canales. Cooper’s lived time, which changes as his body is subject to time dilation, greatly motivates him to succeed in order to return to his daughter, whose body is feeling time via age in a much quicker fashion than Cooper. This, in turn, raises the stakes of the film as Cooper

desperately tries to not lose what valuable time he has left to see his family again, but must also keep in mind his mission: to save humanity. The film's reliance on existing scientific theory to frame the narrative reveals the film's interest in exploring human experiences of varied temporalities and lived times in accordance with the current scientific understanding of time.

Interstellar engages with multiple aspects of the Theory of Relativity, attempting to explain the theory in simplistic terms to the audience to the point of basic understanding that allows for the use of the theories as part of the narrative. Einstein's theory of relativity, which explains the behavior of spacetime in response to the effects of gravity, consists of multiple principles that combine to understand the force of gravity. The first concept explored by *Interstellar*, which much of the narrative tension rests on, is gravitational time dilation.

Gravitational time dilation refers to the basic principle that time is not experienced equally in all places within space. Rather, "a mass slows down time around itself" (Rovelli *Order of Time* 12), meaning that the gravity of the mass affects the passage of time on and around the mass. Thus, time passes differently on different planets according to their gravity. As Carlo Rovelli writes in *Seven Brief Lessons on Physics*, "the passage of time is internal to the world, is born in the world itself in the relationship between quantum events that comprise the world and are themselves the source of time" (Rovelli *Seven Brief Lessons* 44). This relationship is applicable to the smallest measurement of space, as "times are a legion: a different one for every point in space" (Rovelli *Order of Time* 16), and thus the distinction between how fast or slow time passes can be categorized at any level based on how small the chosen form of measurement is—whether between a person living at sea level and person living in the mountains or between Earth and Jupiter. In *Interstellar*, the comparison is made between Earth and the proposed planets for human habitation. When the crew approaches the first planet, Miller's, which orbits an

enormous black hole, physicist Romilly explains that the planet is dangerously close to the black hole because “a black hole that big has a huge gravitational pull” (*Interstellar* 01:02:48). Cooper initially misunderstands the issue and suggests a flight path, to which Brand responds that the issue is not reaching the planet, “it’s time. The gravity of that planet will slow our clock compared to Earth’s drastically” (*Interstellar* 01:02:58). In case this explanation does not sufficiently convey the concept of gravitational time dilation to the audience, Romilly provides the exact comparison, stating that “Every hour we spend on that planet will be seven years back on Earth” (*Interstellar* 01:03:07). By defining the exact ratio of the time dilation, the film allows the audience to grasp the dire temporal effects of the planet’s gravity in relation to the human experience of time, as the characters’ experience of dilated time on Miller’s planet has the potential to ruin not only their chances of saving humanity but also the chance for Cooper to see his children again.

Once the crew lands on the planet, they discover the planet’s inhabitable environment but Brand attempts to recover Miller’s data, resulting in Doyle’s death and the flooding of their ship’s engines from the planet’s enormous tidal waves. They are forced to wait for the water to drain from the ship, to which Cooper asks, “What’s this gonna cost us, Brand?” (*Interstellar* 01:13:49). The use of the word “cost” implies the value of time as a currency, with years of life traded for the slim possibility of discovering a new, habitable planet. As Cooper and Brand realize the immense value of the time that has now slipped from their fingers thanks to their extended visit to the planet where every hour is seven of Earth’s years, they become increasingly irate. Cooper, near tears, frustratingly inquires how he might regain the time lost, indicating how desperate their loss has made him. The nail in the coffin is the framing of their return, a wide shot filmed from behind Brand as she stands on the left side of the frame while the hatch door

slowly opens in center frame, revealing Romilly standing behind it. He has obviously aged, having remained in orbit and thus not fallen victim to the time slippage. The reverse shot shows Brand and Cooper's shocked faces as they confront a visual representation of their time that has been lost, before learning the exact value of their loss: 23 years. Romilly's posture, grayed hair, and disheveled appearance demonstrate a body that has lived the time that Cooper and Brand have not, physically experiencing temporality. His aged body is a reminder of the time that has passed not only for him, but for those on Earth, including Cooper's children. This suspicion is confirmed by the next shots of the sequence, in which Cooper enters the communication room and views the video messages sent by his son, which span the two decades that Cooper experienced as three hours. The use of the video messages to indicate the aging of his children and Cooper's visceral reactions to each video—a mixture of laughs, sorrowful tears, and eventually despair as he grips the screen with his hands after Tom's final video saying goodbye—illustrate the pain of the experience of time dilation. The very last video of Murph, who has finally reached the same age as Cooper thanks to the dilation, ultimately breaks Cooper, who sobs uncontrollably at the sight of his daughter who has now lived the same amount of time as himself.

Cooper's approach into the black hole in the third act of the film also demonstrates gravitational time dilation, but to a much greater degree. As he jettisons himself from the main spacecraft in a sacrificial moment that represents his acceptance of the fact that he will never see his children again and subsequently, his devotion to the crew's mission to find a new planet for humanity, he narrates his entire experience of his descent into the black hole. Rovelli describes the way a human in a black hole's experience of temporality would change, just as Cooper's would, because "time does not pass at the same speed for him as for those outside the black hole,

for the same reason that in the mountains time passes faster than at sea level...the difference in the passage of time is enormous, and what for the observer on the star would seem an extremely rapid bounce would appear, seen from outside it, to take place over a very long time” (Rovelli *Seven Lessons* 47). As the horizon is reached and Cooper passes into the black hole, he would experience a severe time dilation from the black hole’s gravity because “the mass of the black hole slows time to such a degree that, at its border (called the ‘horizon’), time stands still” (Rovelli *Order of Time* 54). Once inside, Cooper states that he has a visual of “the event” of the black hole, then describes it as “Blackness...it’s all black” (*Interstellar* 02:18:10-15). In this moment, Cooper’s visual environments indicate his experience of time: time is not flowing, and thus, there is nothing to see because the light from anything within the black hole has no time in which to travel to Cooper’s eyes.

As Cooper traverses further into the black hole, another concept relating to Einstein’s general and special relativity becomes relevant. Einstein’s professor Hermann Minkowski proposed a view of the temporal structure of spacetime known as a light cone, which represents the path of a flash of light (event E) as it moves through space over time. If the flash of light was represented on a two-dimensional plane, it would appear as a circle that gets larger as it moves into the future, while the past circles converge into a single point. When represented three-dimensionally, the event E of the flash is the center point, with two cones extending from it, the one converging into the point being referred to as a “past light cone” while the one growing from the point is the “future light cone” (ultimately interchangeable titles as long as it is understood that one cone refers to the light flash traveling into the future while the other is the past prior to the event E). All events within the past light cone have the potential to affect the light cone’s center point, “event E.” Carlos Rovelli describes in *The Order of Time* that the light cones of

each event are not lined up perfectly such that each of their pasts combine into a uniformed “past.” Instead, given the gravitational time dilation described earlier, the speed at which time flows at various points in space changes, distorting the orientation of the light cones. These gravitational waves, which cause the curvature of spacetime, can shift the light cones and “the structure of the cones can even be such that, advancing always toward the future, one can return to the same point in spacetime” (Rovelli *Order of Time* 52) because the cones can line up in a circular orientation. As a result, “a continuous trajectory toward the future returns to the originating event, to where it began” (Rovelli *Order of Time* 53) because in a circular orientation, the future light cone of the most recent event lines up with the past light cone of the initial event, meaning that actions in the future can affect the past. When Cooper enters the black hole, he experiences tenseless time, in which “past, present, and future are simultaneously real, and time is mappable, like space” (Gardner 168). In the black hole, he encounters a physical representation of temporality via versions of Murph’s room over time, indicating that this phenomenon is occurring to Cooper. Earlier in the film, Brand explains to Cooper that the beings who opened the wormhole and allowed humans access to the second galaxy “are beings of five dimensions. To them, time might be another physical dimension” (*Interstellar* 01:15:39). The scene in the black hole envisions the experience of time as a physical dimension, allowing Cooper to engage with the moments of the past as he moves through the past events of his life. Cooper eventually affects the past from his place within this “time dimension” by creating the lines in the dust that lead Cooper from the beginning of the film to NASA, creating a time loop in which he causes his past self to embark on the journey that led him to his current position inside the black hole—meaning he is both the cause and the effect of his journey. Essentially, Cooper’s light cones of the events that occur to him in the film align in a circular manner such

that he is constantly moving forward in time, but his actions in the black hole are within the past light cone of the inciting incident of the film, so they cause the events of the past. This paradox loop, in which Cooper acts upon and is acted upon, reveals that time can be both linear and nonlinear at the same time, folding back on itself should the circumstances arise.

Once Cooper orients himself within the time dimension, he and TARS realize that “they didn’t bring us here to change the past” (*Interstellar* 02:28:30) and that they must transmit the quantum data to 33-year-old Murph waiting back on Earth. Cooper first notices the moment from the beginning of the film when the dust storm blows into Murph’s room and lines of dust piled onto the floor, exclaiming “I brought myself here!” (*Interstellar* 02:29:34). In this scene, the film engages in jump-cut editing between adult Murphy on Earth attempting to solve the gravity equation that will allow humans to leave Earth and Cooper in the black hole’s time dimension trying to give her the data, cutting between first Murph’s pondering that the dust on the ground wasn’t from a ghost but was an effect of the manipulation of gravity and then Cooper’s realization that he must communicate to Murph through the dust on the ground and later, the watch. In the black hole, Cooper watches young Murph put the watch on the shelf and assures TARS she will understand as an adult, followed immediately by a shot of adult Murph grabbing the watch. Through the side-by-side editing of these two scenes, the first of Cooper communicating to young Murph and the second of adult Murph searching for answers, the film engages in yet another of the principles of the theory of relativity: Einstein’s relativity of simultaneity. As put by Carlos Rovelli, “the idea that a well-defined *now* exists throughout the universe is an illusion, an illegitimate extrapolation of our own experience” (Rovelli *Order of Time* 44), because the experience of present time does not extend beyond one’s own frame of reference, and certainly does not span millions of light years away. Given the curvature of

spacetime already established, two events occurring at different points in space cannot be assumed to be occurring at the same point in time, it depends on the reference point of the observer. For example, two lightning strikes that hit the ground may be seen as happening at the same time to an observer standing far away and equidistantly, while an observer in a moving car driving towards one lightning strike will see that strike before the one farther away, so did the lightning strikes occur at the same time? To one observer, yes, to the other, no. In the same manner, the observer in this case is the audience: we observe these two scenes occurring back-to-back, and even spliced together. In our minds, this creates a feeling of simultaneity—both events are happening at the same time. In the reality of the film’s world, Cooper’s affecting actions on Murph’s timeline has zero correspondence to the same moment in time of adult Murph’s discovery of the watch. To Cooper, he is in the past and cannot see the outcome of his attempt to communicate, to Murph, she cannot observe Cooper in the black hole affecting the path, and to the audience, we can see both and they are occurring at the same time. Ultimately, through editing, the film raises tension by altering the way we perceive the events of the film, as adult Murph has only minutes to figure out any last clues before she must leave the house, but Cooper theoretically has all the time in the world—literally represented by the physical infinity complex of Murph’s bedroom over and over again—to send his message and perhaps see his daughter again.

Establishing the Wibble-Wobble

In the *Doctor Who* (2005-present) season three episode “Blink,” the show begins to define and set up its concept of time beyond the simple explanations offered in the previous two seasons. Rather than having the Doctor explain how time works directly to his companion, and

thus, the audience, the show utilizes the form of time itself to inform the audience about the way time works in the Doctor Who universe. The episode uses the character of Sally Sparrow as the audience's eyes into the world of the Doctor, as she experiences everything from the outside perspective. This reversal from the usual structure of Doctor Who, in which the audience follows the Doctor and his companion, interrupts the typical framework thus far established by the show and establishes a complex structure of nonlinear yet serial time.

The episode delves into nonlinear time, introducing the concept of a life lived nonlinearly and implying the rules regarding altering time. Sally's experience of time first becomes nonlinear when she encounters the writing on the wall warning her about the weeping angels. The writing on the wall tells her to "Duck, now" ("Blink" 01:43-01:47), causing her to duck as a rock narrowly misses her head. This instance instigates the occurrences of actions in another time influencing Sally's time of the present. Sally's time further upends from its initial linear progression as her friend Kathy succumbs to the Weeping Angel's touch and finds herself in 1920, all while Sally receives a letter from Kathy via her grandson, who exists in Sally's present. Sally visits Kathy's grave, which states her death date as 1987 and displays the paradox created by Kathy's death occurring before she was born ("Blink" 12:37). Sally then encounters police inspector Shipton twice: once as a young police officer who asks her out, and later that day as Shipton dies as an old man in a hospital bed. Shipton meets the Doctor when the angels transport him back in 1969, but is later shown dying in 2006 ("Blink" 27:24). Although the Doctor does not have the TARDIS at the moment they meet, Sally later sends the TARDIS back to 1969 to reunite with the Doctor, meaning the Doctor could not—and therefore did not—take Shipton back to his own time. Both of these encounters establish that once sent back in time by a weeping angel, one must live out the rest of their life from the point in time they arrive at,

regardless of the time-traveling abilities of the Doctor in the TARDIS. The disruption of time created by the weeping angels establishes the structure of nonlinear time in the show and also resists the idea that the Doctor can travel to any time and undo any event that occurs.

Rather than ever exist in the present time of the episode, the Doctor affects the present time by acting in times either “past” or “future” in relation to Sally’s time. Following the first contact of the writing on the wall, the Doctor talks to Sally through the extra features of multiple DVDs from decades prior to the time when Larry and Sally discover them. When Sally and Larry watch the video in the house, they realize that what the Doctor says lines up with their responses to create a conversation. Larry records a transcript of their conversation, which the Doctor reveals he used to create the video in the first place—a circular structure of time that Sally notices. The order in which the show presents this information acts as an example of time in the Doctor’s universe, which, instead of working linearly from cause to effect, is “from a non-linear, non-subjective viewpoint, it’s more like a big ball of wibbly-wobbly, timey-wimey stuff” (“Blink” 30:07-30:15). The Doctor emphasizes the importance of perspective, indicating that linearity is directly related to the way time is viewed—such as through a plot of a story. Thus, time itself is not nonlinear, but the “viewpoint” is, exemplified by the Doctor, who embodies this non-linear viewpoint as he jumps across serial time in a non-linear fashion. The Doctor imparts important advice to Sally regarding the angels through this conversation, which she uses to return the TARDIS to the Doctor in the past and kill the angels in the process. She then sets the events she just experienced in motion by handing the transcript Larry recorded to the Doctor a few months in the future so he can record the DVD extras in the past. The Doctor thus affects the present time from the past using information created in the present and delivered to him in the

future—an impossibility in a world of linear time but understandable in the nonlinear view time of the Doctor’s universe.

The Weeping Angels themselves function specifically within the time of the world of the show, gaining power by stealing time. As revealed by the Doctor, the angels “don’t exist when they’re being observed” (“Blink” 31:52), they only move when not seen, feasting on the “time energy” of people they catch unawares. The angels are “quantum locked,” thus they do not experience time and space unless not observed. The angels’ experience of time thus occurs in segmented, disjointed time, as they do not experience time while frozen as stone. Instead, they steal time from people, sending them back into the past and “consume the energy of all the days [they] might have had” (“Blink” 22:52) in the present. This stealing of time makes up for the time they lose due to their natural state of being, which curses them to forever live time disjointedly. As the angels approach Sally and Larry, the show uses a light blinking on and off to illustrate the angels’ movement, showing frames of the angels in increasingly closer positions with cuts to black between them. The visual form of the blinks creates the illusion of the angels moving through time as they move toward Sally and Larry at an increasing speed, heightening the anticipation as the angels threaten to steal their time away. To the angels, serial time does not exist, as they are unable to experience the movement of time at all; there are no tenses of time to them. Thus, still frames are used to depict their “movement” as they close in on Sally and Larry, mirroring their static experience.

Rupturing Fixed Time Using Paradox

The angels return in the season seven episode “The Angels Take Manhattan,” in which the show delves deeper into the concept of fixed time in contrast to time that can be altered. The

idea of fixed time relies on the “serial” version of time, or time where events have a past and a future and occur in order. Serial time differs from the telling of a story linearly or non-linearly, as seriality refers to time itself occurring as a movement from past to future events, also known as “tensed time” (Gardner 162), while linear storytelling refers to the order in which the events of time are presented. In *Doctor Who*, the characters move non-linearly through serial time, jumping from one event to another, but time itself remains serial in nature. “The Angels Take Manhattan” displays that time in their universe is serial and thus can be manipulated via paradoxes that the characters create by moving in a non-linear path through time.

The show uses the book that Amy and the Doctor read as a device to introduce the idea that time cannot change once the events of time are known to those destined to live said events. When they realize the events of the book parallel the events happening in reality, Amy starts to read ahead, before the Doctor warns her, “you can’t read ahead...once we know what’s coming, it’s fixed” (“Angels Take Manhattan” 12:35-12:55). His statement contradicts the established idea that “time can be rewritten,” (“Angels Take Manhattan” 13:02) a concept brought up over and over again in the show—by Amy, in this instance. However, rather than accepting this statement, the Doctor replies, “not once you’ve read it” (“Angels Take Manhattan” 13:04), establishing a new manner in which time behaves in the universe. He elaborates, saying, “once you know what’s coming, it’s written in stone” (“Angels Take Manhattan” 13:07). Up until this episode, time in the show behaves flexibly and allows for change, which the Doctor takes advantage of to enact the best outcomes. However, this additional rule limits the opportunity for alteration of the timeline. This idea permeates throughout the episode, as River must break her wrist to escape an angel’s grasp because Amy read that it would occur prior. The knowledge of an event before it happens upends the linearity of the episode, as the Doctor and Amy have

limited access to know the events of their future. Once they access this knowledge, the event is no longer in flux, altering the state of the event's time to be set in the timeline. The setting of the event solidifies the serial nature of the event's time, as the event must then occur in the future.

Although the book sets up a state of fixedness in which time cannot be changed, when Rory's fate lies in the mix, the troupe devises a way to change time despite knowing the outcome of Rory's life. When Rory discovers the angels have trapped him in the hotel in order to send him back in time so he lives out his life in the hotel and feeds the angels with his time energy—a structure based on the initial concepts introduced in “Blink.” Once the troupe's idea for Rory to outrun the angels proves undoable, his solution to escape from the hotel relies on creating a paradox, dying before he is sent back by the angels to die in the hotel. The creation of the paradox changes the future, as Rory cannot die as an old man in the hotel if he is already dead. This paradox breaks the structure of fixed time set up earlier in the episode, causing the event to fold in on itself. While Rory and the group take advantage of this collapse, the creation of the paradox causes the entire event and the hotel itself to cease to exist. The destruction of the hotel and the entire event of the group traveling back in time to 1938 reveals that fixed time cannot be changed without consequence or dissolution of the event and those surrounding it. The episode emphasizes seriality as a function of time, as the paradox they use to defeat the angels relies on serial time to implode the event into itself.

Despite their victory, Rory and Amy become victims of fixed time, revealing the emotional side effect of the unchanging power of time. At the beginning of the episode, the Doctor tells Amy, “I hate endings” (“Angels Take Manhattan” 08:32), ripping out the final page of the book so he never reads the end of the story. As we later learn, the final page of the book is Amy's farewell to the Doctor after her untimely end. Unbeknownst to all involved, the Doctor

inadvertently tries to avoid saying goodbye to Amy by ripping out the page in the book earlier in the episode. Even so, the Doctor cannot prevent Rory from seeing his name on the gravestone and solidifying his fate to die before the present time in the graveyard, which Amy chooses to join him in. No matter how much the Doctor pleads, he cannot change time nor can he go save them from the past due to the instability of the paradox event, and thus must let his two companions go. The heartbreak of being forced to adhere to time's serial and fixed nature becomes apparent through the Doctor's reaction to Amy's goodbye and disappearance. The final scene, in which he reads the last page of the book written by Amy, simultaneously signals his care for Amy and indicates his moving on to the next set of events, symbolized by the Doctor's reading of the final page of Amy's story lining up with the final moments of her last episode in the show ("Angels Take Manhattan" 42:29).

Same Bodies, Different Time

Building off of the jumping across serial time that occurs in *Doctor Who*, the time presented in Shinkai's *Your Name* exemplifies simultaneous time, or the experience of multiple times at once, through the form of body-switching. Although the film eventually reveals it still acts within the constrictions of linear time, the film's editing creates the experience of simultaneous time. As the two main characters cross unknowingly cross times, they are subject to the relativity of simultaneity and thus perceive to be experiencing what in reality is past, present, and future time all as present time. Through the exploration of time in the eyes of two teenagers, Shinkai focused on the emotions and feelings of experiencing time together and apart, and the connections formed across time itself.

When Mitsuha and Taki put together that they have been waking up in one another's bodies, they assume they are switching bodies within the same time frame—moving across space but not time. The pair, along with the audience, assume they are experiencing the same moments in time while embodying the other's body, as this is how we experience time in relation to others in reality. To Taki and Mitsuha, as well as the audience at the beginning of the film, the pair's experiences appear to conform to a linear telling of time. Our established way of experiencing and describing time is a linear one, and thus, we adhere to this framework unless explicitly told to think otherwise. Later in the film, however, when Taki visits the ruins of Mitsuha's village, he realizes the two live in two different periods of time: the glimpse into Mitsuha's life experienced by Taki and seen by the audience occurs three years prior to Taki's present (*Your Name* 00:49:40-00:50:00). Rather than switching solely through space, they have also been switching across serial time. In simultaneous time, or tenseless time, the past, present, and future all coexist in reality "and two different points of view can be mapped simultaneously" (Gardner 168). The pairs' experience demonstrates simultaneous time, as the two perceive their experience of two different moments of time as occurring at the same time, or simultaneously. Additionally, unknowingly watching the two characters living in different times forces the audience to view multiple temporalities at once. Although from different perspectives, either Mitsuha lives in the past and Taki lives in the present or Mitsuha lives in the present and Taki lives in the future, we still witness various temporalities at once while watching the two switch bodies across time.

Simultaneous time remains hidden in the film to both the characters and the audience until the emotional structure of the film begins to intensify. To Taki and Mitsuha, their individual timelines appear linear because they experience time in linear order as they switch from one body to the other. Since they only experience the local events around them when they switch

bodies, the two never notice that they live in completely different times. The film facilitates this same linear experience for the audience through editing, cutting between scenes showing the pair waking up in each other's bodies and scenes where they inhabit their own bodies. The form of the editing creates a false sense of linear time to the audience, perpetuating the idea that the two live in the same time and tricking the audience into thinking they are experiencing time linearly. When the body-switching ends and Taki seeks out Mitsuha's village Itomori, only to find it in ruins, the film briefly stops cutting between the two characters and remains on Taki before revealing that the film has been presenting simultaneous time via the switching of bodies across time. This reveal of multiple temporalities coincides with the first intense emotional peak of the film: the devastating moment when Taki and the audience realize Mitsuha is dead in Taki's time.

Emotion ties directly into the presentation of time in the film, which comes to a head in the second half of the film. The scene after Taki finds the remains of Itomori embodies the sorrow of the discovery of Mitsuha's death, using desaturation of color and the weather to represent the emotions of the film. The contrast between the vivid colors of the sunset as Taki finds the ruins of Itomori and the dusty blues and grays of the same scenery as Taki visits the shrine reflects Taki's feelings. Furthermore, the dark gray storm clouds that hover over Taki in the scene and the rain that pours down relentlessly also mirrors the devastation of the scene, especially as Taki's tears join the rain on his face. Following the dark, somber scene, Taki is swept into a dream flashback sequence (*Your Name* 01:01:43-01:03:24). This sequence consists of lighter colors, a sketchier style of drawing, and creative editing, returning to simultaneous time as Taki views various points from Mitsuha's life, experiencing her past, present, and future all at the same time.

When Taki—in Mitsuha’s body—discovers that Mitsuha tried to visit him in Tokyo the day before in her time, but the version of Taki she met had no knowledge of her, he is overcome with emotion as he realizes that Mitsuha’s present collided with his past. At this moment, he realizes that the two’s timelines are subject to simultaneous time and, full of emotion, he bursts into a sprint to the mountain to find Mitsuha in his own body, three years in the future. The two arrive atop the mountain as the sun sets and twilight begins, allowing them to transcend serial time and speak face to face (*Your Name* 01:18:13). Simultaneous time becomes embodied in its truest form as the pair exist in multiple temporalities at once, and emotions take over as the pair finally meet, illustrated by Mitsuha bursting into tears. The following scene consists of beautiful and brightly colored backdrops, intensifying the joy and emotions of the scene. As the rich colors of the sunset fade away and the simultaneous time ends, the joy felt by the characters fades away to sorrow once again as they forget one another entirely.

The experience of simultaneous time shared by Mitsuha and Taki not only illustrates the emotional effect of time but demonstrates how access to various temporalities at once allows for time and space to be changed. Mitsuha and Taki develop a deep connection through their body-switching across space and time, fostering emotions that guide them toward each other and, in turn, saving Mitsuha’s entire village. When Taki and Mitsuha talk on the mountaintop, he tells Mitsuha, “You still have things to do” (*Your Name* 01:20:27), referring to her goal to save the people of Itomori by evacuating them. The knowledge of the future Mitsuha gains through sharing bodies with Taki—or her experience of the temporalities of both her future and her present—enables her to affect the future by taking action in her own present. In Taki’s near future, coinciding with Mitsuha’s farther future, the pair have forgotten about one another, but Taki still feels the impact of the past, wondering “Why does the scenery of a town that no longer

exists wring my heart so?” (*Your Name* 01:38:00-01:38:03). While the memory has faded away, the emotions of the experience of simultaneous time remain strong, eventually leading the pair back to one another through the connection they formed across their pasts, presents, and futures. In the final moment of the film, the two encounter one another and realize they know one another, shedding tears of joy as they smile, once again revealing the intense emotions related to their connection formed across time. By engaging in both serial and simultaneous time, *Your Name* achieves one goal of using multiple forms of time, reaping “the pleasures and rewards of imaginatively inhabiting a tenseless time without surrendering the conventional models of time” (Gardner 174), as the pair saves the people of Itomori and find their way back to one another at the end of the film.

The Zero-Sum Game of Time

The film *Arrival* relies on flashbacks and flashforward scenes as a narrative tool to tell the story and present the concept of simultaneous time to the audience. Much like the presentation of simultaneous time in *Your Name*, the film shows past, present, and future as equally accessible, but it takes the visual form one step further to blend the temporalities together for both the protagonist Louise and the audience. In contrast to the other texts examined, this film completely departs from serial time entirely, relying on simultaneous time as the only form of temporality by the end of the film. The structural tools of editing, which engage in what time studies refers to as analepsis and prolepsis—flashback and flashforward, respectively—are used so heavily in the film that they create the film’s visual form. The film achieves the form of simultaneous time through analeptic and proleptic editing, demonstrating the physical and emotional difference of time experienced all at once.

Throughout the film, memories of Louise's daughter, presented and then interpreted as analeptic flashbacks, function as a demonstration of the use of editing in the film to simulate simultaneous time as experienced by Louise. In turn, this creative editing underscores the climactic reveal of the film: Louise does not experience time serially. The film's opening sequence introduces Louise's daughter through a montage of clips that appear to be a flashback, showing Louise and her daughter from her birth to her death from cancer only a few years later. The montage ends when Louise says, "I'm not so sure I believe in beginnings and endings" (*Arrival* 00:03:58), hinting at the dissolution of serial time that the film reveals later. This beginning sequence sets up the idea that Louise had a daughter who died before the events of the film, a concept relying on the audience's perception of time as linear—our predetermined framework for thinking about time. When studying late at night, Louise begins to hear the voice of her daughter (*Arrival* 00:59:04-01:01:21). The camera keeps Louise facing off the left of the screen while leaving considerable room behind her head on the right side—an open space on screen mirroring the space in her mind that her daughter's voice invades. The frame zooms in on Louise's shocked face as the memory's audio continues to play, hinting at an emotion of disbelief that the audience cannot label as such until the reveal later in the film. In this moment, the audience perceives her look as that of sadness or emotional upheaval at the memory of her dead daughter. The film cuts to her walking in the field, intercut with flashes of two scenes: tucking a younger version of her daughter into bed and staying at her daughter's deathbed. Overwhelmed by these memories of her daughter, she reacts physically, doubling over before she turns to look at the alien ship. Her look insinuates that the flashbacks have some connection to the ship, once again foreshadowing the influence of the aliens on Louise and her experience of time and memory. These memories, suggested to the audience to be flashbacks, actually occur

proleptically as *flashforwards*, explaining why Louise finds them to be so disconcerting; she experiences memories that have yet to be created. This use of editing, in combination with the audience's assumption that Louise's memories fall along a serial timeline, presents a deceptively linear storyline for the audience before the ultimate reveal that not only is the plot nonlinear, but Louise's experience itself does not adhere to serial time.

The film emphasizes nonlinear storytelling by displaying how Louise relies on her future memories to solve her problems in the present and vice versa. To illustrate the concept, after the explosion and the communication blackout, Louise sits in a briefing plagued by flashes of her future as the team tries to figure out what to do with the mystery message from the aliens and the lack of ability to communicate. She recalls her daughter asking about a term that she herself cannot remember and tells her, "If you want science, call your father" (*Arrival* 01:20:53), at which point the film cuts back to a close-up of Louise as she wakes up to discover Ian—the "father" Louise references in her future memory—scientifically speculating upon a realization about the data. In the briefing, Ian refers to the idea of a trade as a "non-zero-sum game" and Louise responds with a face of shock before the film cuts to the future scene, in which she bears the same face in the close-up as she provides her daughter with the answer in a different time (*Arrival* 01:24:07-01:24:14). At this point in the film, the audience believes the scenes of her daughter to be in the past, but this scene disrupts this belief. However, upon first, or even second, viewing of the film, the editing between the present and the other tenses of time occurs so often that the audience may not even catch that the scene suggests that the memory of her daughter occurs in the future, not the past. The scene additionally consists of editing that reveals the way Louise's mind has begun to work—in a simultaneous fashion, experiencing the question and the answer back-to-back when, in serial time, the two moments occur years apart.

This so-called “nonlinear editing” becomes further established during the scene when Louise attempts to figure out the data sent by the heptapods just before the explosion. As the camp evacuates, Louise approaches a computer and experiences a flashforward to the book she writes about the language of the aliens. The scene of her logging onto the computer intercuts with a shot of her unwrapping her book and flipping the pages open, suggesting that Louise is experiencing this prolepsis in her mind as she logs onto the computer in the present. After pulling up the data on the computer, Louise closes her eyes, a gesture indicating the act of remembering, before the film cuts to her future self turning the page of her book. Present tense Louise zooms on the symbols on the screen and her eyes widen in recognition as the film once again cuts, this time to the classroom in the future where she teaches students the heptapod language. Back in the present, Louise proclaims that she can read the symbols in the data, blatantly demonstrating her ability to draw upon memories from her future to assist in the present (*Arrival* 01:36:40-01:37:42). Having established the idea that Louise can remember her past and her future thanks to the heptapod language, the film relies on nonlinear editing to once again show how the simultaneity of Louise’s memories allows her to succeed in the film’s climax.

In the climax of the film, Louise waits for evacuation when she “remembers” a moment from her future in which she attends a celebratory gala for the heptapod incident and is approached by Chinese General Shang, who tells her she allowed for this celebration of unification. Future Louise appears confused as the general insinuates that she called him eighteen months prior, stating she does not have his private number, to which the general replies “Now you know” and shows her his phone. The confusion Louise displays creates the distinction between altering a serial timeline and the overall experience of simultaneous time. Rather than a traditional flashback or flashforward, future Louise has the same knowledge as Louise of the

present: she does not know the general's number until he shows it to her and does not know to call him until he confirms that she called him eighteen months ago. The film's editing thus displays the scenes in sequential order as they occurred to Louise—nonlinear to the audience but in order for the way Louise experienced them. Louise experiences the gala scene right after she experiences being evacuated, explaining why Louise at the gala is equally confused as to why the general says she spoke to him: to Louise, she has not yet talked to him on the phone, despite being serially in the future. Back in the camp, Louise realizes that her phone call to the general must have occurred at her moment in time, prompting her to find a satellite phone and dial the number. As the phone rings, she mutters, "What do I say?" implying that she is waiting to experience the gala in the future again to find out what to tell the general. The film once again cuts to the gala, where Shang begins to lean in towards Louise. The following intercuts between the two scenes mirror Louise's tension as she bounces between experiencing present and future, waiting to hear the phrase in the future and repeat it to the general over the phone in the present. Finally, the general whispers the phrase to Louise at the gala, the first half of which she repeats over the phone, before it cuts back to the gala where Shang finishes the phrase and Louise in the present pauses before reciting it (*Arrival* 01:39:35-01:43:37). While the editing of linear films has trained audiences to view this sequence of edited scenes as a flashback to a memory that then feeds the character in the present information, in this scene, Louise literally experiences two different moments of time in sequence, learning information which she then uses in a different moment in time. Ultimately, Louise's ability to perceive time without tenses allows her to traverse time to prevent a global political conflict. However, as her time becomes increasingly simultaneous, she must confront the experience of her entire life all at once, revealing the emotional toll of simultaneous time.

As the film comes to a close, Louise's final monologue played over a final montage of clips "across time" conveys to the audience the magnitude of her sacrifice. In the monologue, Louise states that "Despite knowing the journey and where it leads, I embrace it," followed by a montage that begins with the birth of her daughter and reveals her life in which she married Ian and raised their daughter together (*Arrival* 01:46:25-01:47:53). As the montage plays, the audience realizes that although she possesses foreknowledge that her daughter will die of cancer and Ian will leave because he resents her choosing to not change her decisions thanks to her foresight, she still chooses the future memories shown throughout the film over changing her life entirely via her future decisions. The film cuts between prolepsis of her future memories with Ian and their daughter Hannah, the present where Louise asks if Ian would change anything if he could see his entire life at once and the two begin their relationship, and sometime in between when Louise answers Ian that she wants to have a baby. This final montage not only contains the highest emotional peak, but also utilizes the most visual form of analepsis and prolepsis because "our emotional engagement constitutes, in many instances, the most intense, vivid, and sought-after qualities available in the film experience" (Carroll 24). Thus, the combination of editing, a melancholy score, and the narrative emphasizes the intense emotions of the scene that the audience continues processing long after the credits roll as they watch Louise chooses to undergo the pain and suffering of her marriage breaking down and her daughter's death for the sake of the good memories she experiences. The film presents the audience with the question alongside Ian: "If you could see your whole life from start to finish, would you change things?" (*Arrival* 01:48:04-01:48:10), forcing us to ponder whether the pain of our lives is worth the joy—an emotional ultimatum presented by the visual form and narrative structure of the film.

The Future of Time-Based Media

The German television show *Dark* brings a new level of engagement with the human experience of temporality through its exploration of time within the fictional small town of Winden. As the group of main characters encounters a temporal anomaly in a nearby cave, they begin to realize the overlapping ties that hold together the town span across time. Time travel is a major plot point of the show, inciting what appears to be the initial incident that rapidly unravels into a massive web of connections, secrets, and temporal leaps. *Dark* combines structural, scientific, and visual forms of temporality to create a complex narrative regarding temporality, revealing how time does not have to conform to a single model, but can be explored in multiple forms within a single narrative.

The structural format of *Dark*, as it not only cuts abruptly between past, present, and future, but exchanges characters across these time periods, results in narrative complexity via the manipulation of the show's discourse time. In *Complex TV*, Jason Mittell defines discourse time as "the temporal structure and duration of the story as told within a given narrative" (Mittell 26), referring to the ways that narratives skip over periods of unimportant time, switch between times and events, and slow down or speed up the presentation of certain moments or scenes. Mittell also writes that "complex narratives often reorder events through flashbacks, retelling past events, repeating story events from multiple perspectives, and jumbling chronologies—these are overt manipulations of discourse time, as we are to assume that the characters experienced the events in a linear progression" (26). *Dark* engages in this "jumbling" of chronologies by switching between the three main periods of time and presenting younger and older versions of each character. However, rather than manipulate discourse time to alter the experience of time to be perceived as nonlinear despite the characters still experiencing the events serially, *Dark* jumps

between times in order to follow the characters in their serial progressions because the characters themselves are still moving through time from their past to their future. Thus, the show's discourse time serves to follow each character/s story in a serial fashion for the purpose of audience comprehension, despite the nonlinearity of the show itself.

The show's opening voiceover reveals the show's perception of time as nonlinear and cyclical, breaking the fourth wall to speak toward the audience. Thus, the first words heard by the audience outline the framing of time for the entire show, stating that "We trust that time is linear, that it proceeds eternally, uniformly, into infinity. But the distinction between past, present, and future is nothing but an illusion. Yesterday, today, and tomorrow are not consecutive, they are connected in a never-ending circle. Everything is connected" ("Secrets" 00:30-01:19). Rather than treat any scene as "in the past" or "in the future," or engaging in the "mismatches between the order of events in the telling and their order told" (Phelan 242) that is analepsis and prolepsis, the show follows each character linearly through their experience of time, even if said character jumps between periods in time. Even if a younger version of a character appears directly after the older version, one cannot be considered the "main" or "present" version of the character, as each version of each character has their own storyline and narrative elements. For example, in the episode "Alpha and Omega," the older version of the character Helge travels back to 1986 and attempts to kill his middle-aged self in order to prevent the kidnappings, all while the younger Helge lies in the bunker in 1953 before traveling through the wormhole. All three of these versions of Helge have their own storylines and none of them are the "main" version of Helge. The fact that the older Helge interacts with the middle-aged Helge in what would be considered older Helge's past proves that each version can be

considered an individual character that can affect the world they exist in—no matter what period of time they are in at any given moment—without temporal repercussion.

The show's entire first two seasons remain within a single timeline, which remains singular, although it is disjointed by time travel. No action taken by any characters in the first two seasons, no matter where they travel to, violates the loop and creates an entirely new world. In "Crossroads," the Stranger, later revealed to be an older version of Jonas, warns younger Jonas that taking Mikkel Nielson back home to 2019 from 1986 would result in Jonas never being born, as Mikkel grows up to be Jonas' father. This action, which Jonas decides not to take, would result in a change to the timeline in which Jonas never is born, thus altering the rest of the events that have already unfolded. The first two seasons thus address the way that time is disjointed and nonlinear within a singular world or universe, displaying how each character is connected throughout time, not in a past-to-future linearity, but in a circular manner. One of the most prime and obvious examples is that mentioned earlier: Mikkel, who disappears in 2019 and emerges in 1986, growing up to become Jonas' father despite originally being his friend and peer in 2019. While the time of the show itself is presented as tenseless, or time without the tenses of past, present, and future, the characters are shown to have serial timelines. The show's choice to follow the characters in a linear manner indicates that the characters do, in fact, have pasts and futures—further confirmed by the younger, middle-aged, and older versions of the characters revealed throughout the seasons. The show thus illustrates that time moves serially, but demonstrates that it can be equally simultaneous and cyclical as it can be serial, revealing the complex and conflicting nature of time.

Although the creation of a wormhole within a cave on Earth seems wildly improbable, it follows the scientific theory of Einstein-Rosen bridges, or a tunnel connecting two different

points of spacetime, seen in the show via each character's traveling forward or backward in time inside the cave. At 48:56 of "Alpha and Omega," the show illustrates the wormhole on screen as a spinning circle that slowly expands in the 1986 version of the bunker in front of Jonas, before cutting to young Helge sitting in the bunker in 1953, who watches the hole open to reveal Jonas in 1986. The two reach their fingers tentatively across the wormhole, visually resembling the moment of genesis displayed by Michelangelo's *The Creation of Adam*, with tears in Jonas' eyes before his face is distorted as he is pulled into an entirely different time across the wormhole. In this climactic moment of the first season's final episode, the show exemplifies the Albert Einstein quote displayed at the very beginning of the show: "The distinction between past, present, and future is only a stubbornly persistent illusion" (00:00:18). The wormhole is the center of time's nonlinearity, an anomaly that perpetuates the cyclical time which affects the family lineages of most of the show's characters. In the case of *Dark*, the theory of causation via Minkowski's light cones—earlier explored by this paper in *Interstellar*—is revisited, this time with the wormhole acting as the mechanism which allows for the future light cone of one event to line up with the past light cone of another, over and over again until the light cones are in a cyclical formation feeding into each other. While the characters continue to move forward along their path, each character's linear path leads to various points along the timeline as they jump between the time periods, and thus each character's "continuous trajectory toward the future returns to the originating event, to where it began" (Rovelli *Order of Time* 53), even if not always in the same form—for example, Mikkell, who eventually reaches 2019, but as a grown Michael Kahnwald, or the older adult Jonas returning to 2020 at the beginning of season 2.

Dark presents a visual motif to represent the fragmented and interconnected structure of time using images of the characters and the events occurring in Winden pasted on a wall. The

opening montage of the show, which accompanies the voiceover discussed above, shows the first photo wall in detail, individually showing photos of each character in their various iterations throughout time revealed in the show. Despite each shot only focusing on an individual character, it appears that twine has been strung between photos, connecting characters to one another. The final shot of the montage, at 01:28 of the episode “Secrets,” reveals the entire wall in the frame, dimly lit as the camera slowly dollies out. The string connections and photographs are difficult to make out entirely in the image, revealing to the audience only that the characters are connected to one another in some way but it remains unclear who is connected and in what way. As the first images seen of the show, the photo wall mirrors the voiceover’s message: all of time is connected and each character has connections that cross time, as mapped by the strings drawn between photographs. In the first episode of the second season, “Beginnings and Endings,” it is revealed that the initial photo wall belongs to Jonas, who has created the web on the wall of the bunker in 2053. Later in the episode, Peter and Charlotte Doppler discover photographic evidence that proves Noah has traveled through time, pasting it onto their own wall of evidence that they have built on the wall of the bunker in 2020, mirroring Jonas’ wall 33 years in the future. These images are a visual form of past, present, and future all contained in a single frame, indicating the way the film treats each tense of time as accessible by all characters in a simultaneous model of temporality.

Despite the show’s insistence that tensed time is an illusion, there is a visual distinction between the time periods of the show that alters the viewer’s perception of time within the show. The 2019-2020 time period has the most standard color grading, although slightly desaturated, it aligns most closely with the visual appearance of the world through our eyes. In the scenes depicting 1986-1987, the colors are more saturated to highlight the brightly colored clothing that

marks the time period as the 1980s. This also matches the coloring of the bright blue wallpaper and decorations in the bunker in 1986 where Noah takes the kidnapped boys. On the other hand, the scenes from 1953-1954 have an excess of grays and browns, creating a look of warm-toned desaturation that enhances a time period less occupied by modern technology. Once Jonas arrives in 2052-2053, the coloration turns to a desaturated blue-gray appearance, highlighting the cold, dark world post-apocalypse. This subtle yet clear division between each period of time displayed in the show allows the audience to discern when in time the scene is occurring, reducing the confusion created by the time travel. However, this adds an additional layer of visual complexity that categorizes scenes and characters by time period, supporting a disjointed experience of time by viewers. Had all the various time periods appeared identical to one another, it would have created a blend across times within a shared singular space: Winden. Yet rather than support the initial premise introduced by the show, that time exists solely simultaneously, these subtle differences indicate a level of complexity on par with what Gardner refers to as “serial-simultaneous” combination model of time that long-form serial TV such as *Dark* has taken to attempting to “straddle” (Gardner 173). *Dark* thus heralds the next wave of narratives engaging in the exploration of time beyond simply serial or simultaneous, using science as a foundation to create new and undiscovered ways to explore time within film and TV.

Conclusion

In examining these five texts, the power that time-based media has over the perception of time by both diegetic characters and the audience becomes clear. Each of the texts manipulates time to engage in multiple models of temporality, namely serial time and simultaneous time. While seriality is generally maintained throughout the text, acknowledging the movement of

characters through time from past to present to future, simultaneous time is additionally presented in each text in various forms, resulting in a nonlinear structure of storytelling. The inclusion of both serial and simultaneous times within these texts, often occurring in tandem, illustrates the additional complex dimension of time provided by film and TV via visual design, editing, and narrative. As a result, these films and television series explore a level of time comprehension and perception that goes beyond the human experience of the real world, elevating the spectator experience such that the audience might understand the variety of time that exists and the ramifications of experiencing complex time.

Although each of the texts engages in presenting multiple temporalities by different means, the end result is still very much the same. Demonstrating that not only is there a singular “now,” these texts also reveal the existence of not only one model of temporality, as we are used to in our world, but other models that can co-exist with the serial nature of the time we experience. Ultimately, time-based texts that examine the human experience of time and the various complexities that make time ineffable allow for a broader and more in-depth understanding of the possibilities that our universe holds and exemplifies the cooperative nature of the multiple modalities of time.

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