TEMPO E VISIONE FILMICA: ESPERIENZE TEMPORALI DEGLI SPETTATORI

a cura di Stefano Ghislotti e di Elisa Pezzotta

marzo 2016

Kacie L. Armstrong and James E. Cutting

Viewer Comprehension and Temporal Shifts in Hollywood Film

> Let us define a plot. We have defined a story as a narrative of events arranged in their time-sequence. A plot is also a narrative of events, the emphasis falling on causality. 'The king died and then the queen died' is a story. 'The king died, and then the queen died of grief'' is a plot. The time-sequence is preserved, but the sense of causality overshadows it.
> E. M. Forster (1927: 86)

Narratives, or the plots outlined by Forster, are often described as chains of events linked over different locations and times by causes and effects (see, for example, Thompson 1999). Events, or scenes, are typically thought of as more or less singular happenings among characters in a contiguous space across a segment of continuous time. Some scenes fall one upon another without a temporal break and these are called sequences. But causal linkages among such units are sometimes complex and often extend between noncontiguous scenes. Instead those links are often presented at the end of one scene only to be picked up much later. Such links go by the charming name *dangling causes* (Bordwell, Staiger, & Thompson 1985). Thus, the notion of a chain, one link connected only to the next, is an inexact metaphor. Causal links can be multiple from one scene to many that follow, and effects can link back to several earlier scenes. Such is the causal network

found in many popular movie plots, tying together scenes and sequences that take place across space and time.

Polking defined a scene in drama as "a division within an act of a play, indicated by a change of locale, abrupt shift in time, or the entrance or exit of a major character" (1990: 405). We will follow this lead as applied to film (see also Cutting 2014), and discuss these three ways, and all their combinations, that the narrative can shift. In this article we will consider all classes of scene-to-scene transitions, but we will concentrate on those that introduce an ellipsis of time, and describe their development and change historically over a century of cinema.

Historical Change and the Temporal Dimension of Film

Much of the history of film can be traced as the evolution of cinematic editing techniques. Technological advances and stylistic developments in editing have allowed for film to move from a single shot medium to one of captivating spectacles of fantasy and complex narrative that flow seamlessly from one shot to the next.

The earliest films were single-shot *actualitiés,* or slices of life (Parkinson 1996). Examples include Auguste and Louis Lumière's *L'arrivée d'un train en gare de La Ciotat* (1896), which is about 50 seconds long and unsurprisingly shows a train arriving at a station. Others include the single-shot staged performances, such as William Heise's *The May Irwin Kiss* (1896). All such films relied on highly simplified narratives, in part because the technology of the time did not allow for the conventions of continuity editing that define popular film today. As a result, time was linear and not manipulated by any narrative or causal standards. As noted by Genette (1980), in such cases narration time (the duration of the movie) and narrated time (the duration of the event in the movie) are the same – although, to avoid aversive flicker, a disparity between the rate at which frames were shot and displayed often resulted in a sense of faster than natural motion on the screen.

Such films placed few viewing and comprehension demands on audiences. This early method of filmmaking is known as tableau style, because the camera was set far back from the action while the narrative played out in much the same way as theatrical performances, resulting in a visual presentation akin to pictures or paintings (Bordwell 2013). While the tableau style of the late 19th century involved no editing, the turn into the next century was marked by considerable experimentation in this domain.

As film evolved into a more complex narrative form, movies got longer and several shots were joined together to create a one-scene film. The cut debuted in the first decade of the 1900s, as in G. A. Smith's *As Seen Through a Telescope* (1900), where the point-of-view (POV) shot first appeared (Bordwell 2007). In its first shot one sees a man looking over a wall through the telescope followed by a cut to an image of a woman having her shoe tied, the object of his gaze with the now-conventional circular aperture denoting POV vision through a telescope. Similarly, in Edwin Porter's *The Gay Shoe Clerk* (1903) a straight cut occurs where a closeup was needed (now called an insert) in the second of three shots to show a younger woman slowly lifting her skirt to her knee, flirting with the clerk fitting her shoe. Clearly, shoe tying was a provocative and sexy event 125 years ago. Both films, however, still consisted of a single scene and thus had no narrative shifts. Narration time still equaled narrative time.

In this same decade cinema introduced scene changes and transitions of various kinds. Scene changes likely did not pose any substantial difficulty in viewer comprehension, as audiences had been conditioned to understand them through their exposure to novels and particularly to comic strips, which often could shift locations, characters, or time across panels (Thompson & Bordwell 2010). Certain transition types also posed little problem. Scene changes in film were often marked by dissolves and fades just as they were in the magic lantern slide shows of the previous decades (Barber 1989). These suggested a change in time or place or characters, or any combination of these.

Transitions between scenes could initially be marked by straight cuts, as in Porter's *The Great Train Robbery* (1903), where in ten minutes, ten scenes – each a single shot – are linked only by cuts. But again here there were no shifts in time. But by D. W. Griffith's *Intolerance* (1916), which has many jumps in time across four stories from four historical eras, essentially all narrative shifts were marked either by intertitles that announced the scene changes, by dissolves, or by both. In particular, dissolves became conventionalized to indicate changes in time. As Dmytryk (1984: 83-84) noted, the dissolve came to serve as a "time machine" that cued the viewer to the fact that time has elapsed.

Wipes appear to have been introduced in G. A. Smith's *Mary Jane's Mishap,* (1903), where two vertical wipes signify changes in time between the death and erection of a tombstone of the lead character (a change in location and time), and then before the arrival at the gravesite of several friends (a change only in time). Later, however, wipes were used largely to indicate changes in location and character (Cutting, Brunick, & DeLong 2011), but not in time. Most of the wipes in George Lucas's and Akira Kurasowa's films are used this way.

The introduction of cuts in film quickly paved the way for the practice of continuity editing, begun by Edwin S. Porter and others in the early 1900s. Continuity describes both the physical elements of film style (including temporal and visual consistency across shots) and the psychological sense of uninterrupted ongoingness within the mind of the viewer (Armstrong & Cutting, in preparation). Continuity is achieved through edits that seamlessly pull the viewer along a narrative stream of shots and scenes. The relative ease of processing movie narratives is linked to shifts in media norms and viewer expectations. Through continuity editing, the viewer becomes immersed in the narrative, a phenomenon called *narrative transportation,* as established by Gerrig (1993) and developed by Green and Brock (2000). Narrative transportation is achieved by viewers without regard for the editing techniques that define the temporal progression of the film.

By the 1960s and later continuity in film was heightened by enhanced editing strategies that led to what Bordwell (2002; 2006) described as *intensified continuity* – more rapid editing, increasingly mobile cameras, and an increased use of close-up shots. Other aspects of this intensification include the increased omission of small stretches of time within a scene. For example, a character starts to get up from a chair, then appears next to another character in the subsequent shot without the filmmaker having shown the first character crossing the room. This small ellipsis is known as "removing the shoe leather," the bits of film devoid of necessary information while the character is walking about.

Since continuity editing relies on techniques that have taken decades for filmmakers to cultivate (Bordwell 2002), likely through cultural transmission across generations (Cutting, Brunick, DeLong, Iricinschi, & Candan 2011; Cutting & Candan 2015), the evolution of continuity has resulted in a film viewing experience marked by focused attention, the buildup of tension, and narrative immersion that was not possible in the early days of film. Intensified continuity also achieves a sense of narrative cohesion between shots within scenes, even rendering cuts less detectable by the average viewer.

The cognitive mechanisms supporting this perceived seamlessness can be traced back to Hugo Münsterberg (1916), who posited that editing and framing conventions in film contributed to the smooth flow of images on screen. Münsterberg added that the structure of film mimics the ways in which the mind is engineered to attend to objects and people (via shot scale and precise lighting), to conjure memories (via flashbacks), and to feel emotion (via salient imagery). These ideas have since been empirically supported by data on gaze synchrony among viewers (Smith & Mital 2013), lending support to the notion that filmmakers control the viewing experience by utilizing established cinematic principles that are not obvious to the untrained viewer.

We would argue that the rise of continuity editing (and its intensified extension) was the impetus for viewer comprehension of the

temporal dimensions of modern Hollywood film, which we explore in detail below. First, however, let us outline how atypical editing techniques (i.e. those that disrupt continuity) have historically achieved just the opposite: obfuscation of temporal perception.

While cuts in film were (and very much still are) commonly used to signify narrative shifts, the technology behind early editing techniques also allowed for the artistic manipulation of time in obvious and jarring ways. One of cinema's first special effects entailed the instantaneous disappearance and reappearance of characters on screen, achieved by pausing the camera and spatially rearranging actors before resuming filming. Georges Méliès was a pioneer of this method, and his film *Le Voyage dans la Lune* (1902) was the first science fiction film to push this technique to cinematic limits. Méliès achieved a sense of visual magic by creating scenes of a spaceship crashing into the eye of a personified moon and of characters disappearing into clouds of dust. A magical temporal fluidity was thus born on screen, and audiences were captivated by this turning point in narrative structure, as reflected by the vast international success of Méliès's *Voyage* (Solomon 2011).

The use of editing to obfuscate perception of time has persisted across cinematic eras. A notable body of work taking advantage of such special effects emerged from the surrealist film movement, initiated in France in the 1920s. In contrast to the fantasy films of Méliès, Richardson argued that surrealism did not attempt to invoke a magical, surreal world, but explored "the points of contact between different realms of existence" (2006: 3). Nonetheless, the cinematic embodiment of surrealist thought engaged editing techniques similar to those used in early fantasy films. The crossover of these techniques is likely the result of the surrealist goal to disrupt passive viewing by juxtaposing shots in absurd and illogical ways (Bordwell 2013).

A well-known example in this genre is *Un chien Andalou* (1929) by Luis Buñuel. The plot concerns a lovers' quarrel but is rendered essentially incomprehensible by disjointed and acausal imagery, in-

cluding shots of dead donkeys splayed across pianos and a human hand being prodded in the street by an androgynous woman. Throughout, intertitles depict an impossible time scheme. For instance, "sixteen years earlier" appears within a continuous shot with no break in the action (Thompson & Bordwell 2010). In this manner, the devices used in surrealist film challenge the viewer's sense of narrative cohesion by presenting temporal trajectories confined to incompatible spatial depictions of continuous action.

Today, the bizarre imagery and editing techniques reminiscent of Méliès and surrealism are primarily reserved for avant-garde film. Audiences associated with such films are presumably aware of the inconsistencies that define unconventional narratives and, consequently, know approximately what to expect – or, they know not to expect anything in particular.

We have illustrated how atypical editing conventions disrupted narrative comprehension among early film audiences. However, following this initial history of spectacle and astonishing advancement in film, modern audiences have largely become accustomed to intensified continuity and have no difficulty comprehending the temporal elements of mainstream film. Christian Metz (1974), pioneer of film semiology, argued that films are easily understood because audiences have learned and internalized cinematic conventions, and as a result, they implicitly understand the ways in which cuts signify narrative progression. To pursue this idea further, let us return to the discussion of how continuity editing guides temporal cohesion, first by obviating the need of low-level features such as dissolves to cue the viewer to narrative shifts, then by supporting the higher cognitive constructs of narrative immersion and the willing suspension of disbelief.

The Decline of the Dissolve

With the introduction of sound film intertitles were no longer needed to support narrative comprehension of film, and as a consequence the within-scene cut and the across-scene dissolve, fade,

or wipe crystalized as the narrative style of the early sound era. *All Quiet on the Western Front* (1930), for example, settled into this pattern. However, over the next decades the straight cut increased in between-scene frequency until dominating by the 1960s (Carey, 1974). In films of the late 20th and early 21st centuries, Cutting, Brunick, DeLong (2011) found that straight cuts occur essentially 100% of the time between shots within scenes, and at 90% between shots entailing narrative shifts.

Nonetheless, the change from dissolves to cuts between scenes was textured over decades and full of further experimentation. Filmmakers were quite conservative in their implementation of across-scene temporal transitions, and their products changed only gradually over the first 50 years of the sound era. From a sample of typical films released over five decades, Carey (1974) noted that signaling temporal shifts took nearly seven seconds in the 1920s, five in the 1930s, three in the 1940s, two in the 1950s, but only a half second in the 1960s. The extreme length of earlier temporal transitions was largely due to indexical shots inserted between scenes – flipping calendars, turning pages, speeding clocks, depictions of seasonal changes, and even the use of intertitles well after the end of the silent era. According to Carey (1974) the used of these declined gradually from about 65% to about 3% of all temporal transitions in his sample of movies over five decades. Later, indexical time shifts all but completely disappeared from the filmmakers' repertory, and today are only in situations for generating nostalgic humor.

As a consequence of filmmakers' experimentation and the resulting changes in style, film viewers from the 1920s through the 1960s could rely less on the visual cues of indexical shots combined with dissolves, fades, and wipes to distinguish shifts in time or space. Dissolves generally retreated to two smaller roles – linking shots in what is called the Hollywood montage, a succession of thematically connected shots with unspecified time gaps between them (Metz, 1974, called these syntagma) that promote ambience and are often found at the beginning of films, and de-

noting a particular type of narrative shift, where location remains constant and only time has shifted. Cutting (2014) interpreted this latter trend as evidence that shifts in time while location remains constant are difficult to grasp without the aid of specialized visual signals. Though the dissolve has always served as a technique of temporal clarification, its evolution from a ubiquitous editing technique to an infrequent stylistic choice indicates that the dissolve is no longer necessary in clarifying the meaning of most narrative shifts. What has taken its place?

Modern Hollywood film deliberately strives to reduce the need for such overt visual cues – which call attention to themselves – while simultaneously maintaining a sense of passing time that is easily and implicitly grasped by audiences. Cutting (submitted) found that the frequency of narrative shifts has accelerated since 1940, increasing from about 75 per film to about 150. In addition and collapsing across film eras, among such shifts there are an average of about 100 shifts in location and in characters, and about 50 shifts in time per movie. Since many of these co-occur there are an average of just over 125 shifts per film (Cutting 2014). In addition, with the advent of intensified continuity, many stylistic elements of film have changed: shot durations have gradually become shorter and motion has increased (Cutting et al 2011; Cutting, DeLong, & Nothelfer 2010). Yet, despite the high frequency of shifts in a single movie, as well as the dynamic nature of narrative structure, the viewer often perceives a continuous narrative progression without the aid of obvious shift cues. The fact that the basic structure of narrative form has largely remained unchanged over the existence of film prompts us to ask how it is that these narrative shift cues are no longer necessary.

Part of the answer to this question lies in the way that filmmakers treat "reality" shifts (Messaris 1994), such as those leading into and out of dreams, memories, or fantasies. One might assume that the dissolve would serve as a useful cue to the viewer that an unconventional shift has occurred. Instead, filmmakers appear to be weaving clues about narrative shifts into the visual properties of

the story itself. For example, the creators of *Inception* (Christopher Nolan, 2010) incorporated color into the film to indicate four different dream levels: a grayish, rainy urban landscape; a hotel interior paneled in lush browns; a mountainous landscape covered with deep snow; and the generally brown interiors of an apartment. And in Robert Redford's *Ordinary People* (1980) repetitive flashbacks in the mind of the young protagonist to a boating accident in which his brother was killed are strongly tinged in blue (Cutting, Brunick, & Candan 2012). This device suggests that, in stark contrast to their predecessors, modern filmmakers use visual elements inherent to the narrative (such as the color of carefully chosen landscapes and interiors) to indicate unconventional time shifts, as opposed to unnatural boundary markers that remind the viewer, advertently or not, that she is watching a film.

In early film, dissolves, fades, and wipes were tangible to the viewer, but filmmakers today likely have different intentions than their predecessors. Rather than attempting to enchant audiences with magic and marvel, filmmakers seek to immerse viewers in a story that may or may not be believable on an intellectual level, but that nonetheless captivates audiences by hiding the fact that film is, indeed, a visual medium based on illusion.

Temporal Comprehension through Narrative Immersion

Through a combination of intensified continuity and stylistic devices, filmmakers are generally successful in achieving a sense of narrative immersion among viewers. And to understand how intensified continuity results in viewer immersion to the point that viewers grasp and believe in a narrative progression through time that is separate from their own temporal reality, we return to the *theory of narrative transportation* (Gerrig 1993). Specifically, this theory states that when a viewer becomes engaged in a narrative, her processing of reality beyond the screen is suppressed. This position is corroborated by neural data collected by Bezdek, Gerrig, Wenzel, Shin, Pirog Revill, & Schumacher (2015), which revealed

that an increase in narrative suspense results in reduced activity in brain regions involved in peripheral visual processing, while brain activity associated with central visual processing and attention increases. These results suggest that narrative suspense is the impetus for visual transportation, leading to greater visual and cognitive processing of the fiction presented on screen, while reality beyond the screen goes unnoticed by viewers. Thus, the psychological correlates of narrative immersion imply that a viewer need not be consciously processing narrative shifts or focusing on cuts between shots in order to comprehend temporal progression.

To break this down further, we offer insight into how narrative suspense is achieved in Hollywood film. Cutting (submitted) divided nearly two dozen Hollywood films spanning the years 1940 to 2010 into twenty equal length time bins and calculated the average number of all narrative shifts (time, location, and character) within each bin. The frequency of shifts formed a U-shaped function, with narrative shifts occurring less often in the middle half of a film than at the beginning or end quarters. The duration of scenes at both ends averaged about 45 seconds, while scenes in the middle of a film averaged about 60 seconds, likely due to the fact that more conversational scenes occurred there (Cutting 2015). As conversations are typically longer and slower, and as a film progresses through its narrative arc, viewers' anticipation for the events of the ending climax builds up.

Again, just as Münsterberg (1916) claimed that films are constructed to mimic the way that the human mind attends to stimuli, it seems that conversational scenes in a film, which are typically presented in shot/reverse-shot format with alternating medium close-ups of the chaacters, mimic the way that background information and extraneous stimuli fall away from consciousness as a person engages in a deep conversation with another person. Revisiting the data collected by Bezdek et al (2015), we can reasonably conclude that, by building suspense and tension through a narrative arc marked by a conversational middle, filmmakers foster narrative transportation by causing the viewer to focus primarily

on the screen while ignoring the reality that surrounds her. Furthermore, while conversational scenes tend to be longer, most shots that comprise them are relatively short in duration and close in shot scale. In fact, Cutting and Armstrong (2015) found that facial expressions are harder to read as distance increases. Filmmakers appear to implicitly use this knowledge in constructing film, as shots that are closer in scale (resulting in an increase of the size of a character within the frame) are shorter in duration (Cutting 2015). Thus, filmmakers couple the power of longer, conversational scenes to induce tension with medium close-up shots that are timed to best match perceptual mechanisms. The result is that these segments of film maximally harness viewer attention. In other words, filmmakers are nimble in their ability to combine shot and scene durations in order to construct a temporal framework that best engages viewers.

Time Shifts as a Distinct Form of Narrative Shift

The progression of narrative time in a film complements the buildup of anticipation that is achieved through the narrative arc. The pattern of time shifts across a film shows a different course than the pattern of all narrative shifts (time, location, and character) combined. Cutting (submitted) demonstrated that the distribution of time shifts is linear rather than U-shaped, becoming fewer and fewer as the narrative progresses. This pattern is logical, since the pace in the narrative begins to converge with the pace of narration as the protagonist advances toward her goal. By grabbing the attention of the viewer and then further harnessing the viewer's focus by developing a narrative timeline that increasingly resembles reality, filmmakers successfully induce viewers into comprehending the temporal dimensions of a story.

The tempo in which cinematic time progresses at the same rate as real time is one of four narrative tempos described by Paxson (1994; Genette 1980). This tempo, labeled "scene," can be achieved through thoughtful editing and may even emerge through single shots that are strikingly long in duration (known as a tracking shot or a long take). A prime example of this tactic can be found in *Goodfellas* (1990). Director Martin Scorsese and cinematographer Michael Ballhaus notably use a tracking shot in the famous "Copa" sequence, where the camera follows the main character Henry (Ray Liotta) and his girlfriend Karen (Lorraine Bracco) through the doorways, kitchen, and winding hallways of the Copacabana nightclub. This shot lacks any cuts that would otherwise render the scene a construction of careful editing. The resulting tempo draws the viewer into a temporally realistic narrative with little possibility for distraction, as if she herself were following Henry and Karen through the nightclub.

On the other hand, narrative tempos that depart from a realistic progression of time may serve to disrupt narrative immersion. For instance, the "pause" describes a scenario in which the time it takes to narrate a segment of a story exceeds the passage of time within that part of the story (Genette 1980). The pause is rare in film, though an example of a cinematic pause is the freeze frame, in which the image on screen is still while a narrator speaks. Martin Scorsese and editors James Kwei and Thelma Schoonmaker utilized the freeze frame often in *Goodfellas*, particularly as Henry narrates the story of his childhood. The freeze frame is used to accentuate Henry's father beating him up for skipping school, the mailman being beat up by wise guys for delivering the letter that informed Henry's parents of his truancy, and Henry being congratulated by the wise guys after his first court appearance. Rather than drawing the viewer deeper into the narrative as a tracking shot (and its accompanying scene tempo) does, the freeze frame serves to highlight specific plot points, and in doing so, calls attention to itself. The freeze frame, though celebrated as a marker of Scorsese's distinctive approach to filmmaking, is yet another example of how atypical editing techniques disrupt narrative immersion by virtue of their blatancy.

Establishing Belief in Fictional Timelines

On the other hand, as a result of the careful and normative implementation of continuity editing, viewers comprehend narrative time, but do they believe in it? If viewers are to be narratively transported, there must be cognitive mechanisms at work beyond mere cinematic comprehension. The theory of narrative transportation (Gerrig 1993; Green & Brock 2000) is reminiscent of the concept of the *willing suspension of disbelief*, coined by poet Samuel Taylor Coleridge in 1817. Coleridge (1817: chapter XIV) argued that by imparting an impression of truth through a work of fiction, a writer could trigger in her audience the tendency to ignore any overt awareness or judgment surrounding the false nature of narrative, thus allowing intelligent audiences to enjoy fictional work as a vehicle for entertainment. This concept is especially applicable to a medium as immersive and visual as film. By suspending the tendency to judge the truth of what is perceived, audiences become susceptible to the goals of filmmakers to promote belief in and emotional reactions to their stories.

Inconsistency in narrative time, as exhibited through the freeze frame (among other cinematic techniques), is a prime example of a cinematic trend that relies on the suspension of disbelief. Filmmakers count on the fact that viewers will accept certain impossibilities (or fail to notice them). To further illustrate the role of the suspension of disbelief in viewer comprehension of temporal impossibility, consider the common scenario of a character aging on screen faster than the actor portraying the character ages in reality. For instance, when adult Henry ages nearly a decade over the course of *Goodfellas*, the viewer, who knows that Ray Liotta cannot be aging at such a quick rate over the course of two and a half hours, accepts this impossibility and proceeds to update her cognitive representation of the story being told, allowing for continued engagement with the narrative.

However, the viewer's level of engagement is not so great as to lead her to believe that fiction is reality. Holland (2008) argues that this duality is possible due to the inhibiting system of the frontal cortex, which prevents viewers from acting in response to beliefs and emotions that are generated while watching a film. Thus, viewers do not "test reality" and, consequently, do not disbelieve the stories presented on screen, at least from the viewpoint of narrative transportation. Similarly, Hume (2005: 121), in discussing challenging narratives, argued that "we may temporarily enjoy being lost in a funhouse, and bewilderment can supply that frisson of being lost while not posing so much threat as to drive us away." This idea can reasonably be applied to the narrative complexities of film. Viewers enjoy the twists and turns of Hollywood film, but do not feel threatened by cinematic fiction despite the fact that they are immersed in it. In terms of temporal comprehension, audiences believe in the seamless temporal trajectories established by continuity editing to the degree that they comprehend narrative without having to live it. In fact, it is the very inability to live, or "test," fiction that fosters its belief among viewers.

Viewer Awareness of Temporal Shifts

Thus far, we have explored how filmmakers construct films in such a way that narratively transports viewers by creating a sense of narrative cohesion across scenes and shots. This cohesion allows viewers to not only perceive, but to have faith in, fictional timelines. We now investigate whether viewers demonstrate any reliable knowledge of how temporal structure is assembled in film. Cutting, Brunick, and Candan (2012) asked viewers to segment two dozen Hollywood films (three viewers per film) into scenes by marking the frame where a new scene began. Viewers agreed on the timing of scene changes about 90% of the time, and they demonstrated a greater sensitivity to narrative shifts when all three dimensions of a scene changed (time, location, and character). Likewise, a change in two of the three dimensions resulted in greater sensitivity in identifying a scene boundary than a change in just one dimension (Cutting 2014). Furthermore, segmentation

was easier when scene boundaries were marked by dissolves, wipes, and fades in comparison to contemporary cuts. Cutting (2014) argued that the decline in sensitivity to narrative shifts associated with contemporary editing potentially indicates the success of modern filmmakers in enhancing the continuity of Hollywood film. This idea lends further support to the notion that filmmakers, through careful editing, create a sense of narrative cohesion among viewers.

From the evidence presented we conclude that whether a viewer is immersed in a visual narrative and consequently shielded from its underlying structure or conscious of temporal shifts as they occur is simply a matter of purpose. The locus of attention determines a viewer's state of mind. Her attention may be wrapped up in the story at hand, due to rising suspense as demonstrated by Bezdek et al (2015), or her attention may be shifted to the low level features of narrative structure if, for example, she is interested in the way a film is made.

Conclusion

We have demonstrated that filmmakers have developed cinematic conventions that do not deliberately set out to approximate real time – and they should not, as constructing a narrative is necessarily a practice in subtraction (Hume 2005). As Hitchcock noted "What is drama, after all, but life with the dull bits cut out" (Truffaut 1985: 103). Films engage viewers and sway audiences into believing in the temporal forces that drive a narrative. Filmmakers promote a sense of narrative transportation by carefully crafting films that simultaneously build tension, mask editing techniques, and mimic human perceptual systems.

The filmmaking practices that have evolved to achieve these goals are defined by gradual and slow changes over the course of many decades (Armstrong & Cutting, in preparation). Continuity editing gave rise to intensified continuity, a phenomenon that promotes narrative immersion, which renders the function of narrative shift

cues (such as dissolves, which were a primary substance of early film) both obsolete and distracting. The practice of intensified continuity is painstaking for filmmakers, but the result is effortless viewing for audiences. Indeed, film history is rife with evidence suggesting that the veiled editing techniques of intensified continuity allow a viewer to follow a narrative timeline with no need for consciously calculating the temporal shifts that occur.

BIBLIOGRAPHY

ARMSTRONG K. L. - CUTTING J. E. (in preparation), "Moviegoer aesthetics and intensified continuity", (no journal name).

BARBER T. X. (1989), "Phantasmagorical wonders: The magic lantern ghost show in nineteenth-century America", *Film History* 3(2), pp.73-86.

BEZDEK M. A. - GERRIG R. J. - WENZEL W. G. - SHIN J. - PIROG REVILL K. - SCHUMACHER E. H. (2015), "Neural evidence that suspense narrows attentional focus", *Neuroscience,* 303, pp. 338-345. doi: 10.1016/j.neuroscience.2015.06.055.

BORDWELL D. (2002), "Intensified continuity: Visual style in contemporary American film", *Film Quarterly,* 55(3), pp. 16-28. doi: 10.1525/fq.2002.55.3.16

Id. (2006), *The Way Hollywood Tells It,* University of California Press, Berkeley, CA.

Id. (5 November 2007), "Three nights of a dreamer", *Observations on Film Art.* http://www.davidbordwell.net/blog/2007/11/05/three-nights-of-a-dreamer/ (accessed 26 November 2015).

Id. (2013), "The viewer's share: Models of mind in explaining film", in SHIMAMURA A. (ed.), *Psychocinematics,* pp. 29-52, Oxford, New York.

BORDWELL D. - STAIGER J. - THOMPSON K. (1985), *Classical Hollywood cinema: Film style & mode of production to 1960,* Columbia University Press, New York.

CAREY J. (1974), "Temporal and spatial transitions in American fiction films", *Studies in the Anthropology of Visual Communication,* 1, pp. 45-50.

COLERIDGE S. T. (1817), *Biographia Literaria,* West Fenner, London. http://www.bl.uk/collection-items/biographia-literaria-by-samuel-taylor-coleridge (accessed 1 December 2015).

CUTTING J. E. (2014), "Event segmentation and seven types of

narrative discontinuity in popular movies", *Acta Psychologica,* 149, pp. 69-77. doi: 10.1016/j.actpsy.2014.03.003

Id. (2015), "The framing of characters in popular movies", *Art & Perception,* 3(2), pp. 191-212. doi:10.1163/22134913-00002031

Id. (submitted), "Narrative theory and the dynamics of popular movies".

CUTTING J. E. - ARMSTRONG K. L. (2015), "Facial expression, size, and clutter: Inferences from movie structure to emotion judgments and back", *Attention, Perception & Psychophysics,* 77(8), pp. 1-11. doi: 10.3758/s13414-015-1003-5.

CUTTING J. E. - BRUNICK K. L. - CANDAN A. (2012), "Perceiving event dynamics and parsing Hollywood films", *Journal of Experimental Psychology: Human Perception and Performance,* 34(4), pp. 1476-1490. doi: 10.1037/a0027737

CUTTING J. E. - BRUNICK K. L. - DELONG J. E. (2011), "The changing poetics of the dissolve in Hollywood film", *Empirical Studies in the Arts,* 29(2), pp. 149-169. doi: 10.2190/EM.29.2.b

CUTTING J. E. - BRUNICK K. L. - DELONG J. E. - IRICINSCHI C. - CANDAN A. (2011), "Quicker, faster, darker: Changes in Hollywood film over 75 years", *i-Perception,* 2(6), pp. 569-576. doi: 10.1068/i0441aap.

CUTTING J. E. - CANDAN A. (2015), "Shot durations, shot classes, and the increased pace of popular movies", *Projections: The journal for movies and mind,* 9(2), pp. 40-52. doi: 10:3167/proj.2015.090204.

CUTTING J. E. - DELONG J. E. - NOTHELFER C. E. (2010), "Attention and the evolution of Hollywood film", *Psychological Science,* 21, pp. 440-447. doi: 10.1177/0956797610361679

DMYTRYK E. (1984), *On film editing,* Focal Press, Boston, MA.

FORSTER E. M. (1927), *Aspects of the novel,* Harcourt, Brace, & World, New York.

GENETTE G. (1980), *Narrative discourse: An essay in method,* J. E. Lewin (trans.), Cornell University Press, Ithaca, NY.

GERRIG R. J. (1993), *Experiencing narrative worlds: On the psycho-*

logical activities of reading, Yale University Press, New Haven, CT.

GREEN M. C. - BROCK T. C. (2000), "The role of transportation in the persuasiveness of public narratives", *Journal of Personality and Social Psychology,* 79(5), pp. 701-721. doi: 10.1037//0022-3514.79.5.701

HOLLAND N. (2008), "Spiderman? Sure! The neuroscience of disbelief", *Interdisciplinary Science Reviews*, 33(4), pp. 312–320. doi: 10.1179/174327908X392870.

HUME K. (2005), "Narrative speed in contemporary fiction", *Narrative,* 13(2), pp. 105-124.

MESSARIS P. (1994), *Visual literacy: Image, mind, and reality*, Westview Press, Boulder, CO.

METZ C. (1974), *Film language: A semiotics of the cinema*, M. Taylor. (trans.), Oxford University Press, New York.

MÜNSTERBERG H. (1916), *The photoplay: A psychological study*, D. Appleton and Company, New York.

PARKINSON D. (1996), *History of film*, Thames & Hudson, London.

PAXSON J. J. (1994), *The poetics of personification*, Cambridge University Press New York.

POLKING K. (edited by) (1990), *Writing A to Z: The terms, procedures, and facts of the writing business defined, explained, and put within reach*, Writer's Digest Press, Cincinnati, OH.

RICHARDSON M. (2006), *Surrealism and cinema*, Bloomsbury Academic, New York.

SMITH T. J. - MITRAL P. K. (2013), "Attentional synchrony and the influence of viewing task on gaze behavior in static and dynamic scenes", *Journal of Vision,* 13(8), 16. doi: 10.1167/13.8.16

SOLOMON M. (2011), *Fantastic voyages of the cinematic imagination: Georges Méliès's Trip to the Moon*, State University of New York Press, Albany, NY.

THOMPSON K. (1999), *Storytelling in the New Hollywood*, Harvard University Press, Cambridge, MA.

THOMPSON K. - BORDWELL D. (2010), *Film History: An Introduc-

tion, McGraw-Hill, New York.

TRUFFAUT F. (1985), *Hitchcock*, Simon & Schuster, New York.

FILMOGRAPHY

BUÑUEL L. (1929), *Un chien andalou (An Andalusian Dog)*, Les Grands Films Classiques, France. https://vimeo.com/18540575

GRIFFITH D. W. (1916), *Intolerance*, Griffith Feature Films, USA. https://www.youtube.com/watch?v=ngAiIlziXBo.

HEISE W. (1896), *The May Irwin Kiss*, Thomas A. Edison, Inc, USA. https://www.youtube.com/watch?v=IUyTcpvTPu0

LUMIÈRE A - LUMIÈRE L. (1896), *L'arrivée d'un train en gare de La Ciotat (Arrival of a Train at La Ciotat)*, Star Film Company, France. https://www.youtube.com/watch?v=dJdVEgOMQPM

MÉLIÈS G. (1902), *Le Voyage dans la Lune* (A *Trip to the Moon)*, Star Film Company, France. https://www.youtube.com/watch?v=7JDaOOw0MEE

MILESTONE L. (1930), *All Quiet on the Western Front*, Universal Pictures, USA. https://www.youtube.com/watch?v=7ePKtOwzdIA.

NOLAN C. (2010), *Inception*, Warner Brothers Home Entertainment, USA/UK.

PORTER E. (1903), *The Gay Shoe Clerk*, Thomas A. Edison, Inc, USA. https://www.youtube.com/watch?v=Q2X_BZpnWFc

Id. (1093), *The Great Train Robbery*, Thomas A. Edison, Inc, USA. https://www.youtube.com/watch?v=Bc7wWOmEGGY.

REDFORD R. (1980), *Ordinary People*, Paramount Home Video, USA.

SCORSESE M. (1990), *Goodfellas*, Warner Brothers Home Entertainment, USA/UK.

SMITH A. G. (1900), *As Seen Through a Telescope,* George Albert Smith Films, UK. https://www.youtube.com/watch?v=XJmIuj23bUg.

Id. (1903), *Mary Jane's Mishap*, George Albert Smith Films, UK. https://www.youtube.com/watch?v=QCm51fg5hpk