

The Digital Moving Image: Revising Indexicality and Transparency

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Abstract

Cinema as the projected filmic image has been the focus of moving image theory for over a century. Television and video have taken a back seat for several reasons; in particular that they are often considered as inferior moving image mediums in some aspects, both conveying a lesser degree of transparency and, more recently in digital form, being devoid of indexicality as theorised by Charles Sanders Peirce. That is, they supposedly possess a weaker connection to the real or, what Jay David Bolter calls, “the authentic”. This paper, via Tom Gunning’s work on digital media and the claim to photographic truth, will explore and problematise these notions with the aim of challenging the longstanding primacy of the cinematic moving image as well as softening the analog/digital divide.

KeyWords: indexical, iconic, iconicity, indexicality, transparent, transparency, digital video, film, cinema, television, analogue video, Tom Gunning, Charles Sanders Peirce, semiotics, depth-of-field, Mary Anne Doane, apparent motion, image resolution, digitisation, format size.

The underlying and recurring theme of much academic writing about the rise of digital moving image media appears to constitute a sense of loss. Ji-Hoon Kim frames it as: “the echoes of numerous critics and theorists who have announced the ‘death of cinema’ since its hundredth anniversary in the context of the rapid proliferation of the digital at all stages of cinematic practice, from production to distribution” (Kim, 2009, 50:1, p. 115). Impetus for this sense of loss appears to stem from the notion that the increasing disappearance of the celluloid substrate of the filmic, with its material characteristic of transcription, threatens to erode the very nature of the moving image in its relation to truth and reality; a nature that is often inevitably anchored in film’s inherent indexicality and high degree of transparency. Thomas Elsaesser affirms that “[w]e care about the indexicality of the photograph because we miss it in the post-photographic pixel” and that cinematic evolution in its filmic guise “was underpinned by certain definitions of realism, as a technology of panoramic, total perception and transparency” (Elsaesser, 2005, 14:2-3, p. 92 & 90).

In her recent paper: *The Indexical and the Concept of Medium Specificity*, Mary Anne Doane notes that “within film theory, confronted with the threat and/or promise of the digital, indexicality as a category has attained a new centrality” (Doane, 2007, 18:1, p. 129) and that “[t]oday, it could be argued, it is the indexical associated with the analogical chemical base of the image that emerges as the primary candidate, in contention with the rise of digital media” (Doane, 2007, 18:1, p. 130). Indeed, it is apparent that one of the key distinctions or indicators of “otherness” of digital media has, at least in academic circles, been declared as its failure to possess the esteemed nature of an indexical sign. Even more extreme than this, Doane goes on to say that “[o]ne might go so far as to claim that indexicality has become today the primary indicator of cinematic specificity” (Doane, 2007, 18:1, p.

129). In this suggestion Doane is identifying the general academic understanding of privileging cinema with a connection to the real, or referent, that other mediums apparently do not possess. Lev Manovich, in his pivotal tome *The Language of New Media*, goes further and denounces the actual existence of an image in digital's lack of photographic materiality and connection to the referent¹ (Manovich, 2001, pp. 99-100) and Markos Hadjioannou declares that in lacking an index a digital image is not a "real" image (Hadjioannou, 2008, 8:2, pp. 123-124). In this paper I will challenge these notions, as it is my belief that the relationship between digital photography² and the referent is much stronger than suggested by contemporary digital media theory, and thus warrants additional analysis. Furthermore, a continuing nostalgia for analog, or even mechanically created, forms of moving image media constricts theory in regard to the now dominant cultural paradigm of digital video.

Indexicality, Iconicity, and Symbolism

The concept of indexicality, or the indexical state of signification, was suggested by Charles Sanders Peirce in his taxonomy of signs as objects of created or interpreted meaning. Peirce's concept of index is well defined by esteemed semiotician, Daniel Chandler, as being:

“...a mode in which the signifier is not arbitrary but is directly connected in some way (physically or causally) to the signified - this link can be observed or inferred: e.g. 'natural signs' (smoke, thunder, footprints, echoes, non-synthetic odours and flavours), medical symptoms (pain, a rash, pulse-rate), measuring instruments (weathercock, thermometer, clock, spirit-level), 'signals' (a knock on a door, a phone ringing), pointers (a pointing 'index' finger, a directional signpost), recordings (a photograph, a film, video or television shot, an audio-recorded voice), personal 'trademarks' (handwriting, catchphrase) and indexical words ('that', 'this', 'here', 'there').”
(Chandler, 2009)

In the application of this definition to both analog and digital images it should first be noted that being an index has nothing to do with the sign having a likeness to the signified. Footprints, odours, clocks; none of these appear analogous to the thing they refer to. Photographs do possess a likeness to the

¹ Manovich's use of the term "referent" is synonymous with Peirce's concept of "object", or "what the sign stands for" (Chandler, 2009)

² When referring to digital photography in this paper I include digital video as an animation of digital photograms. Similarly, when referring to analogue photography I also implicate film.

signified³; a representation of the real, but this is not what attributes them the semiotic characteristic of being indexical. This property of analogy evokes another of Peirce's modes constituting a sign; that of iconography. Daniel Chandler, once again, applies meaning to this concept of icon:

“...a mode in which the signifier is perceived as resembling or imitating the signified (recognizably looking, sounding, feeling, tasting or smelling like it) - being similar in possessing some of its qualities: e.g. a portrait, a cartoon, a scale-model, onomatopoeia, metaphors, 'realistic' sounds in 'programme music', sound effects in radio drama, a dubbed film soundtrack, imitative gestures.” (Chandler, 2009)

Hence, analogy is discounted as being integral to indexicality. Being analogous is instead a trait of the icon. It is this very fact of a photograph being of an analog nature on which the “otherness” of digital is often based. William J. Mitchell insists that “[t]he basic technical distinction between analog (continuous) and digital (discrete) representations is crucial here” and that a photograph varies continuously both spatially and tonally, whereas a digital image consists of a non-continuous set of discrete steps (Mitchell, 1992, p. 4). An extrapolation of Mitchell's claim is that a photograph captures analog light rays, which are continuous, and these are represented as continuous gradations of tone and colour on the film grains. Digital photographs exist as independent pixels; each with luminance and colour identified numerically within a limited range, and as such can only simulate the analog light rays that entered the camera lens. In relation to comparing analog images to their digital counterparts Timothy Binkley says: “[t]he concrete physical grains of chemicals in a photograph are replaced by an intangible array of numbers...The end product [may be] a photograph, but it visually “depicts” the numerical contents of a frame buffer, not necessarily the state of any real place at any particular time” (Binkley, 1989, 21, pp. 10-11).

I find it interesting that a comparison of “grains” to a matrix of numbers (or effectively a grid of “pixels”) is often made, as reflected in the quote from Binkley above. Mitchell too declares that there is “an indefinite amount of information in a continuous tone photograph, so enlargement usually reveals more detail but yields a fuzzier and grainier picture” (Mitchell, 1992, p. 6). Conversely, he points out, zooming in on a digital photograph only produces more prominent pixels. These statements, and indeed the idea that the grain is the smallest particle of the photographic frame, overlook an enlargement beyond the ordinarily physically perceivable. Nicholas Negroponte, the

³ In using the term “signified” Chandler is embedding Peirce's concept of the “object” or “referent” into Ferdinand Saussure's framework of semiotics. This increases the referential potential of the signified as a concept more than just a material entity (Chandler, 2009).

founder of *Wired* magazine who famously suggested that we move bits, not atoms (Negroponte, 1995), would perhaps encourage a more detailed inspection; at the particles of energy that are the constituents of matter itself. If the closest possible look is taken at the affected silver halide crystals on the traditional photographic plate we would behold the material equivalent of the digital bits that themselves are the essence of digital media. Upon this realisation we should also acknowledge that these units of matter or energy, or “quanta”, are essentially discrete and hence that the very nature of matter is one of discontinuity⁴.

Of course, the theories of science are neither static, nor ever complete, and as such could soon see the contemporary understandings of quantum mechanics revised. Further, one could argue that a digital photograph in bitmap format is made up of a finite number of pixels which are of a fixed spatial resolution and are themselves discrete, but at an infinite level of digital sampling these too could theoretically resemble the particles that constitute matter, and hence not appear less resolved than film grain at all. Some would argue that even today (though admittedly this issue is highly debated) as film loses a large degree of effective resolution in the normal cinematic process of transferring from negative to print to print (Baroncini, Mahler, Sintas, & Delpit, 2002), by the time it is screened the perceived differences in resolution between 35mm film and high definition digital video are rapidly disappearing, if not already gone (Film School Direct, 2010). In terms of colour resolution, most digital cameras are currently unable to match the gamut that 35mm film can create⁵; but digital image colour and spatial image resolution are constantly improving and this hurdle too will be overcome in time. If nothing else, in my suggestion to look further than at the obvious film grains I would hope to encourage a closer inspection of the similarities between digital and analog photographs, instead of focusing primarily on accentuating their differences.

Interestingly though, within his analysis and distinction of the essence of digital media as immateriality, Mark B. N. Hansen declares the following: “Rather, the image becomes a merely contingent configuration of numerical values that can be subjected to “molecular” modification [author’s emphasis], that lacks any motivated relation to any image-to-follow” (Hansen, 2004, p. 9). Hansen’s inference that molecules and bits can be subjected to modification in similar ways actually implies similarities between the analog (atoms) and the digital (bits) photograph, contrary to indicating any essential difference, or point of “otherness”. His further claim that the digital “lacks any motivated relation to any image-to-follow” also requires investigation; as it once again implies a denial of any digital claim to indexicality.

⁴ The essence of quantum physics itself holds that “a physical property may be quantized”, hence “that the magnitude take on only certain discrete numerical values” (Wikipedia, 2010)

⁵ The colours on a photographic negative, positive, or paper print, are not identical to that of the original scene, but indicative of the gamut that the film stock will allow.

There are several media theorists who have recently sought to defend the claim that digital photographs in fact can possess the quality of an indexical nature as a sign, or a direct connection to the signified: Philip Rosen in his book *Change Mummified: Cinema, Historicity, Theory* (Rosen, 2001, pp. 301-350) and Tom Gunning in his article *What's the Point of Faking an Index? or, Faking Photographs* (Gunning, 2004, 1:2) to name two and their relevant and important works. Gunning points out that there is no reason to perceive that storing information about variations in light as numbers has any effect on its position in regards to being an index (Gunning, 2004, 1:2, p. 40). He goes on to say that, in fact, scientific and medical instruments have been converting their information to numbers for years - long before the very conception of digital media. As examples he offers devices for measuring pulse rate and temperature, speedometers, wind gauges, and the like. Indeed, Peirce in no way excluded the *format of storage* of indexicality when defining it; it needed merely possess a direct connection to the signified. In fact, upon examining the examples of indices provided above by Chandler it is clear that a large variety of methods for storing the effects of the real are possible; with an implication that the list is in no way exhaustive, as long as the condition of a physical or causal direct connection is honoured. From this perspective it begins to seem difficult to exclude the digitally photographed image from enjoying the prized link to a real point in time and space. Philip Rosen suggests that digital information as data would have no effective value if it did not accurately and indexically refer to pre-existing events or entities (Rosen, 2001, p. 307), when we gather and apply this data frequently as if it does both.

Using this framework to evoke further examples of digital's potential for possessing an indexical nature one might question whether there would exist a connection to anything real if a virus infected a computer and destroyed all its data. Indeed, without the existence of an indexical link one would have to assume that nothing actually happened. Similarly, when typing on a keyboard to input letters on a virtual page a person's physical and very real actions are being stored as an indexical sign within the computer's memory. It is not a long stretch from these examples to purport that light that travels through a lens and is captured and converted to an electrical signal within a digital camera is then stored as numbers (i.e. data) as a very real index of the object and scene before it. As Rosen implies, it would be nonsensical to suggest to a family who take photographs of their children with a digital camera that the resulting images have no link to the real event whatsoever (Rosen, 2001, p. 308).

Key theorist of semiotics himself, Charles Sanders Peirce, had this to say about the indexical nature of photographs:

“Photographs, especially instantaneous photographs, are very instructive, because we know that in certain respects they are

exactly like the objects they represent. But this resemblance is due to the photographs having been produced under such circumstances that they were physically forced to correspond point by point to nature. In that aspect, then, they belong to the... class of signs... by physical connection [the indexical class]” (Peirce, 1931-58, p. 281)

Although obviously Peirce was not writing about digital photography, he could well have been, as digital photographs are also “physically forced to correspond point by point to nature” in their effect of focused light through a lens onto an electronic sensor. An interesting question is that if we accept that digital photographs can possess an indexical link to the signified, and as digital copies are perfectly indistinguishable from each other as identical copies of abstract numbers, would a copy of a digital photograph retain that initial photographically indexical link? Unfortunately this line of inquiry is perhaps best left for another paper.

A photographic image possesses the attributes of more than one mode of signification. At the same time as it is an index, or an indicator that something was actually there in front of the lens, it can have iconic value; in that it may have a resemblance to an existing subject, object, or scene. A photograph can also exist in the symbolic mode by, for example, displaying content that is text; as in credits. The relationship between these modes of signification, and the degree to which one is dominant, is complex and is based very much on context and individual perception (Hawkes, 1977, p. 129). I should note that in my discussion of modes of signification and analog and digital photography I may appear to isolate these modes and give them independence, when in reality I am very conscious of their integral nature.

In terms of Doane’s observation that “indexicality has become today the primary indicator of cinematic specificity”, I would posit that indexicality is actually quite removed from cinema altogether; *at least in the sense that the index as experienced by the audience in the cinema has a direct connection with the reality that was before the camera during image capture*. Firstly, one would be unsuccessful in finding a film shown at the public cinema that was not originally shot on a negative and then transferred to at least one positive film print for screening. Indeed, most cinematically screened films are prints of prints; if not prints of prints of prints⁶. This begs the question; can an index be transferred? I would suggest: not directly - at least not within an analog copying process in Peirce’s eyes. A copied index can only be an index of an index as we must

⁶ In fact, original negatives are not used for creating a release (screening) print and the process is actually quite complicated; including further prints called interpositives and internegatives.

remember that, as Doane clarifies: “indices have no resemblance to their objects, which, nevertheless, directly cause them. This is due to the fact that an index is *evacuated of content; it is a hollowed-out sign*” [my emphasis] (Doane, 2007, 18:1, p. 133). Forthwith, the *likeness* of one print to another as what the viewer actually experiences is iconic; not indexical.

I would argue that the only actual index that is present in a positive film print derived from the originally exposed negative is one that shows direct connection with that negative; which itself contained an icon of what was placed before the camera. Any further print made from this initial positive print will possess an indexical relationship with that positive, and so on, and so on. When the movie is finally screened at a cinema the audience will also be watching a moving image whose indexical quality is actually only indicating that somewhere high above and behind them a machine is projecting light through a particular film strip that rushes past the film gate at 24 frames a second onto a reflective screen. In essence they will be so far removed from direct connection to any of the subjects/objects that were in front of the camera during the filming process to suggest that any relationship between the audience and these rests much more strongly with iconicity.

To support this Daniel Chandler, referring to the theories of Deacon et al (Deacon, Pickering, Golding, & Murdock, 1999), states that photographs are primarily icons; in that they resemble what they represent and this is their “real power” (Chandler, 2009). He then goes on to interpret Peirce and say:

“So in this sense, since the photographic image is an index of the effect of light on photographic emulsion, all *unedited* photographic and filmic images are indexical (although we should remember that conventional practices are always involved in composition, focusing, developing and so on).”
[author’s emphasis] (Chandler, 2009)

By the term “unedited”, Chandler is referring to raw photographic images such as the film negative or a Polaroid photograph. This implies that not only does the common introduction of any optical special effects or post production filters erode the importance of the indexical nature of film in a creative sense, but proves the point that making a print of the original negative removes any existence of indexical connection to what was before the camera as it rolled.

The matter is complicated even further with the introduction of the knowledge that by 2007 around 70% of films shown in the cinema had been put through a “digital intermediate” (Belton, 2008, 61:3, p. 58). A digital intermediate (DI) is the process of scanning the original film negative and converting it to a digital data format to allow digital post-production, including effects and colour grading, to be

applied. Commencing around the year 2000, this practice has been widely adopted by producers of feature films, and gets cheaper every year. What it means in relation to the debate regarding the indexicality of cinema is that by the current date very few, if any, films shown in the cinema will *not* have spent time as a collection of abstract numbers as data about the original filmic image. In this case, if the digital image is in no position to claim indexicality, then neither is the bulk of contemporary cinema.

Instead of advocating that cinema is inherently or specifically indexical and evoke the above challenges, one might suggest that the specificity of *film* is indexicality. In some ways, however, film is no more indexical than clay. If I stick my finger into a piece of clay I leave a mark as an index, i.e. a sign that indicates direct connection with the signified. The signified (or object) is, of course, my finger; though the index does not look like my finger. With film, the index is caused by reflected light and hence *looks like* the signified that it is connected with, instead of only *looking like it was caused by* the signified as in other indices. With this in mind it would perhaps be more reasonable to agree with Deacon et al (Deacon, Pickering, Golding, & Murdock, 1999); that the real power of film is in its *iconic* signification, in that the *index resembles what was before the camera that has direct connection with it*. It is pertinent to note here that if my previous argument is accepted; that digital images can also possess the signifying mode of indexicality, then in digital photography the index also resembles what was before the camera. This positions the digital photograph much more closely to that of the filmic.

These issues require one finer degree of scrutiny. That is, what is the importance of indexicality itself in relation to the image? Is it that the viewer of an image *recognises* that it has a direct connection to the real? Perhaps, but how does the viewer know what *real* it is that the image has a direct connection to? I will take as an example, as did Mary Anne Doane in her analysis of indexicality, cinema and the digital (Doane, 2007, 18:1), the shroud of Turin. When the first photograph of a recognisable face imprinted on the shroud of Turin was created it was believed to be that of Jesus Christ, but later proven to be a fraud and indexical only to the existence of a man who lived and died in the 14th century (Doane, 2007, 18:1, p. 142). As Mary Anne Doane agrees: “the stains on the cloth are still evidence of *something*” [author’s emphasis] giving power to the index, but what of the fact that for some time it was suggested that these were a trace of Jesus Christ? The belief of this had little to do with the actual indexical nature of the stains. People were told it was Jesus Christ and they had no means of verifying that information, so some people would have chosen to believe it, and some wouldn’t have. In a sense the shroud had been attributed suggested *iconic* and *symbolic* meaning within society that was individually negotiated in respect to the theological position of its members. This meaning was inextricably linked to the index in that it is one thing for a person to know that an

index has a direct connection to something real, but of little consequence or use conceptualising this without attaching to it an understanding or hypothesis of what that “real” is or might be. Upon being alerted that science had proven that the trace on the shroud in fact wasn’t likely to be connected to Jesus Christ a shift in society’s understanding of the iconic and symbolic meaning attributed to it took place; *as well as a resultant shift in their relationship with its indexical nature.*

In light of the above it is worth asking what the exposed film plate of cinema is actually in direct connection with *as* an index. This, of course, is the actor and the film set. In contemporary cinema an actor is a person who plays a fictional character within a constructed plot, while the film set is a construction made for the purpose of relaying the environmental context of that character and plot. At least for the last half century or so cinematic content has been primarily fictional dramatic narrative, where the audience engages at a diegetic level with the fictional characters and settings; as opposed to actors and sets. In essence, the feature film industry is not in the business of showing actors and sets on its cinema screen. A semiotic analysis of cinema reveals that fictional characters and settings are actually either iconic (in that they resemble a known signified) or symbolic (in that the relationships between the signifiers and the signifieds must actually be learned to be understood). It is quite plausible that cinema *plays* with the notion that as a film based medium it has a direct connection with something “real”, as upheld by its potential for indexicality. In other words, it is saying “*this* is real; what you see on screen”. The truth of course is that it actually provides the audience with nothing but iconicity and symbolism on screen - both in the filmic image resembling actors on a set, and in the actors on set resembling diegetic characters and locations. The viewer knows that the fictional characters and settings are not real, but chooses to relinquish this knowledge in return for pleasure. It has been a long time since cinema was about showing reality on its screens and hence the indexical having a connection to anything “real” besides an actor; be this actor effectively icon or symbol. The viewer’s understanding of this in turn must affect their relationship with the cinematic index itself.

Transparency and the Moving Image Medium

Richard Allen discusses the concept of transparency of a photographic image in his article *Representation, Illusion, and the Cinema*. He states that “(a) photograph is a recording, a mechanical imprint of the image of an object through the causal process by which light reflected from objects registers on photochemical emulsions” (Allen, 1993, 3:2, p. 23). The “causal process” that Allen speaks of is the indexical nature of photography as discussed above. Following the ideas of Kendall L. Walton, Allen goes on to say that the photographic image is a mechanical aid to vision (like a telescope or eyeglasses) and hence can be called “transparent” in this respect. This implies that in an examination of the authenticity or realism of a moving image transparency and indexicality are directly related and that transparency is also interconnected to iconicity.

The concept of transparency in regards to media is defined by Jay David Bolter as: “to place the viewer in an apparently unmediated relationship with the objects or events represented” (Bolter, 2006, 39:2, p. 110). In other words; it is when, in the viewer’s experience, the medium is effectively erased and the technologies and techniques that support it effaced. With regard to moving images it can be defined as how “realistic” or “authentic” the image appears. It seems that film is held in high regard in its transparency within academic circles; for example, Bolter states in *Remediation Revisited*: “The quotation from Hoffman serves the further purpose of underscoring the superiority of film over television as a more lifelike (i.e. transparent) form” (Bolter, *Digital Essentialism and the Mediation of the Real*, 2007, p. 204).

This academic perception of superior filmic transparency quite likely became entrenched over the many years that 35mm film was the epitome of moving image acquisition and presentation. The greatest screen productions with the biggest budgets and the largest sized screens for content presentation were film productions. Indeed in the early days of television it could also easily be said that 35mm film was superior in that it was noticeably higher in screen resolution, tonal range, and colour gamut. Babette Mangolte confirms this belief in her article, *Afterward: A Matter of Time*, in stating that video is inferior to the “precision provided by a much more detailed film image” (Mangolte, 2003, pp. 263-264)⁷. For these reasons the 35mm film aesthetic became embedded into culture as, what Rodowick calls; “the gold standard for visual quality” (Rodowick, 2007, p. 109). These, however, are not the only factors affecting the degree of transparency of a *moving* image. I believe that in some ways video technology has always been more transparent than film, such as in representing movement more accurately, possessing an increased depth-of-field, and exhibiting instantaneity of distribution.

In support of this statement I will begin with an examination of how film represents movement. Film has been shot at 24 frames-per-second for the best part of a century, years after that speed was standardised in the 1920s with the implementation of sound, which required a constant speed for the sound head. Prior to that it was often 16 frames per second, or thereabouts; being hand cranked both during shooting and within the projection theatre. Twenty four frames per second animation provides a certain “short range apparent motion” consistent with that which we experience in our vision of reality (Anderson & Anderson, 1993, 45:1); enough to create visual movement from still frames presented in rapid succession.

⁷ This is a perception that is now under scrutiny as I have detailed in my previous discussion on the spatial resolution of film and digital video respectively.

In comparison, the format of video (be it analog or digital) is often described as also consisting of a certain number of frames-per-second. The exact figures are 25 frames-per-second for countries using the PAL (Phase Alternation Line) video standard and 29.97 frames-per-second for countries using NTSC (National Television System Committee). The important amendment to these animation details is that video is *interlaced*; meaning that each of these frames consists of two temporally displaced consecutive fields. A field is a set of scanlines within each rasterised frame, and are grouped into upper and lower scanlines (or effectively the odd and even numbered scanlines). As one field of the frame is disappearing the second one is emerging. The outcome of this interlacing (also called *interleaving*) is that PAL video is actually scanned at 50Hz – or 50 cycles-per-second – and thus has more than twice as much movement data as film that is shot at 24 frames-per-second. This effectively gives video a closer connection to the mimesis of real movement than film; particularly during sections of the footage that incorporate large camera or object/subject movements. As support of this it is common knowledge amongst film-makers that fast panning camera shots will incur a strobing effect on stationary objects when shooting on film. The technical name for this effect of the slower film acquisition rate is “judder” (Brennan, 2010), and can also be seen present on HD video footage shot at 25 frames-per-second⁸.

Further evidence of disparity between the transparency of the filmic and the televisual can be shown from an analysis of large-screen liquid crystal displays (LCDs) on the market today and the way that content such as live sport and news are presented as opposed to movies. LCDs compete within an aggressive market of comparison of features and image quality with one of the key elements valued for people who watch sport being the screen’s *effective* refresh rate. This is analogous to the “frame rate” within film projection. In essence, the higher the refresh rate of an LCD the more frames-per-second are shown and as such the clearer the apparent movement. That is; less perceptual motion blur between frames. The technology actually digitally creates new frames of motion between existing frames; a process called “motion interpolation” (Tech Target, 2008). The “movie mode” on these television screens disables this increased refresh rate as it can create a “video-like” look on movies that have been shot on film that is undesirable to the avid movie viewer (Birch-Jones, 2009). Feature length movies that are shot on digital video cameras today are still shot at 24 non-interlaced (progressive) frames-per-second for this same reason, while sport and news is shot at over twice that cycle rate at 50 or more interlaced fields-per-second. Contemporary high definition digital video cameras will offer you a choice of either shooting format; one for a cinema/film aesthetic and one for a television/video aesthetic.

⁸ In fact the apparent judder on High Definition Video footage is actually worse due to its greater depth-of-field and sharper image (Roberts, 2002, p. 8)

There is another aspect of the film aesthetic that I would like to explore that I see as diminishing its degree of transparency; that of the photographic phenomenon “depth-of-field”. The depth-of-field in a photographic image is the portion of the image that is sharp enough to appear in focus, and this portion is directly dependant on physical properties of the image acquisition technology: including lens, light, camera-to-subject distance, and format size. The property of format size, which can be identified as the film frame on 35mm film cameras and the image sensor on a digital video camera, affects the depth of field in an acquired image in that the larger the format size, the shallower the depth-of-field. Thus, being substantially larger than a digital video image sensor the 35mm film frame incurs a smaller depth of field within the image when shooting (Koppelman, 2006, 4:1). This means that more areas of the photographed image will often be out of focus, or at least more out of focus. This is part of the film aesthetic; a softer, more velvety image with less of the image being in sharp focus.

Of course, when watching sports or news the viewer does not want to be limited in their clarity of the scene. They want the ability to peruse the frame at will and make their own decision as to what to focus their visual attention on in a very Bazinian form of deep-focus image. Hence video, with its larger depth of field and thus more of the image in focus, is a preferable format for television coverage of sporting events and news; both of which are deemed to be more objective in their portrayal of reality. The continuous montage style of live-switched multiple cameras completes the television aesthetic as a presentation of non-fiction content.

Film’s shallower depth of field is what makers of movies for the cinema screen employ in order to direct the viewer’s attention to a particular object/subject on screen, as well as to create a fictional narrative world with parts of the screen that a viewer cannot themselves bring into focus. It is an aesthetic of the artistic more so than the scientific; the unabashed manipulation, and what Irving Singer would call “the transformation of reality” (Singer, 1998), for fantastical purposes. It is the filmic look that videographers have been attempting to emulate since the inception of video, as Babette Mangolte describes: “...most filmmakers, instead of embracing this [the extreme sharpness and pristine quality of the edges], use a change in shutter speed available in the digital camera menu to obtain what the cinematographer calls a ‘film look’, a blurring around the edges specifically in shots with quick movement” (Mangolte, 2003, p. 265). The ‘film look’ that Mangolte describes, or the “goal of perfect photographic credibility” that digital motion pictures aims to achieve, as David Rodowick phrases it (Rodowick, 2007, p. 109), I believe lies in remediating the cinematic system of signs that implies artistry, quality, and expense; not in the realm of exhibiting a greater transparency than video.

There is one more aspect of transparency that I should raise when discussing this concept in regard to moving image mediums. If it can be appreciated that the degree of success of transparency is judged in direct relation to the technology that supports a medium, then it can also be appreciated that transparency applies not only to images that transgress time, but also that transgress space. That is, a film based image such as that viewed in a traditional cinema is an image that may perhaps often be displaced spatially from its source, but is most definitely displaced temporally. In other words; film is not an instantaneous medium. The delay experienced between the acquisition and subsequent screening impacts on the viewer's perceived transparency of the moving image. With the medium of television, or in fact any electrical moving image medium, the image can in fact be "live" or a representation of somewhere else *right now*. Mary Anne Doane supports this in her analysis of television in its relation to photography in saying that "[t]he temporal dimension of television, on the other hand, would seem to be of an insistent "present-ness" – a "*This-is-going-on*" rather than a "*That-has-been*," a celebration of the instantaneous" [authors emphasis] (Doane, *Information, Crisis, Catastrophe*, 2006). This instantaneity adds a whole new degree of transparency to the moving image; erasing the medium not just in making someone feel like they are there, but that they are there *at the present time*.

Thus, in many ways, television is indeed a step towards greater transparency of the moving image than cinema, though these have been overlooked by moving image theorists in favour of 35mm film's higher apparent screen resolution. Further indication of television's greater transparency is that prior to its introduction newsreels were played in the cinema before the main movie screening. It should be recognised that a newsreel is a genre of the screen where the characteristic of transparency would be highly regarded and sought after. Indeed, a subject such as news (which is inherently information) requires an appearance of objectivity and a closer link between the indexical and the iconic more so than being obviously subjective and ensconced in the realm of symbolism and the iconic; as cinema currently is.

Extending Allen's point made previously in this article regarding the relation between indexicality and transparency, I would also suggest that the level of perceived transparency in a moving image (analog or digital) is directly related to the degree to which its indexicality is associated to its iconicity. That is, the more similar an icon is in appearance to its signified, the greater the perceived unmediated relationship (i.e. transparency) of the viewer to the real events or objects represented. Following on from my discussion of moving images and the existence of the semiotic mode of indexicality, this would suggest that the electrical moving image mediums of television and digital video, in possessing in many ways greater degrees of transparency, may also actually hold more claim to the importance of their indexicality than cinema.

Conclusion

In this paper I have argued that the cinematic semiotic mode of indexicality is not as unique and authoritative as might be implied in academic writing of such. This is consequential via negative-printing, post-production effects, fictional characters, constructed places, and that the digital photograph deserves the right to claim indexicality itself. I have contested cinema's reign of ultimate transparency in light of its comparatively low frame rate, shallow depth-of-field, and essential property of temporal displacement; regardless of its currently debatable position as the most highly resolved moving image medium. Perhaps daringly I have even suggested that cinema is not entirely of analog nature; at least not at the atomic level and in the eyes of contemporary quantum physics.

In challenging the filmic moving image like this I have used as counterpoint its two cousins; television and digital video. In many ways through my arguments they have often resulted in looking more authentic, more transparent, and perhaps more real. It is not through the notion of denouncing film or cinema that I have made my claims, as I too have a penchant for traditional media and will shoot on film by preference if offered the appropriate associated budget. But it is with nostalgia, a lean towards artistry, fantasy, and a taste for the signification system of the silver screen, that I will do so - not because I feel it has any increased power over, or direct connection with, anything "real" or "true to life".

My aim of this paper is to instead offer an alternative perspective of moving image media that seeks to create an antithesis to the general theories at hand. In doing so I hope not to idealise online digital video or digital media in general, but to dispel some of the persistent myths of "difference" and notions of "lesser" in favour of a more harmonious and positive digital academic aspect.

Works Cited

- Allen, R. (1993, 3:2). Representation, Illusion, and the Cinema. *Cinema Journal*, 21-48.
- Anderson, J., & Anderson, B. (1993, 45:1). The Myth of Persistence of Vision Revisited. *Journal of Film and Video*, 3-12.
- Baroncini, V., Mahler, H., Sintas, M., & Delpit, T. (2002, September 20). *Image Resolution of 35mm Film in Theatrical Presentation*. Retrieved June 16, 2010, from Commission Superieure Technique: http://www.cst.fr/IMG/pdf/35mm_resolution_english.pdf
- Belton, J. (2008, 61:3). Painting by the Numbers: The Digital Intermediate. *Film Quarterly*, 58-65.
- Binkley, T. (1989, 21). Camera Fantasia: Computed Visions of Virtual Realities. *Millenium Film Journal*, 10-11.
- Birch-Jones, D. (2009, August 12). *Higher Refresh Rates in LCD Television: Do They Make A Difference | AVguide*. Retrieved April 12, 2010, from <http://www.avguide.com/blog/higher-refresh-rates-lcd-tvs-do-they-make-difference>
- Bolter, J. D. (2006, 39:2). The Desire for Transparency in an Era of Hybridity. *Leonardo*, 109-111.
- Bolter, J. D. (2007). Digital Essentialism and the Mediation of the Real. In H. Philipsen, & L. Qvotrup, *Moving Media Studies: Remediation Revisited* (pp. 195-210). Forlaget Samfundslitteratur.
- Brennan, M. (2010). *Judder*. Retrieved June 14, 2010, from Michael Brennan Director of Photography: <http://hd24.com/page4/page15/page28/page28.html>
- Chandler, D. (2009, January 13). *Semiotics for Beginners*. Retrieved August 6, 2009, from <http://www.aber.ac.uk/media/Documents/S4B/sem02.html>
- Deacon, D., Pickering, M., Golding, P., & Murdock, G. (1999). *Researching Communications: A Practical Guide to Methods in Media and Cultural Analysis*. London: Arnold.
- Doane, M. A. (2006). Information, Crisis, Catastrophe. In W. H. Chun, T. Keenan, & (eds), *New Media Old Media* (pp. 251- 264). New York: Routledge.
- Doane, M. A. (2007, 18:1). The Indexical and the Concept of Medium Specificity. *Differences*, 128-152.
- Elsaesser, T. (2005, 14:2-3). The New Film History as Media Archaeology. *CiNeMAS*, 75-117.
- Film School Direct. (2010). *HD Video Vs 35mm Film*. Retrieved June 15, 2010, from Film School Online: http://www.filmschooldirect.com/sample_lessons/sample_lesson_HD_vs_35mm.htm
- Gunning, T. (2004, 1:2). What's the Point of an Index? or Faking Photographs. *Nordicom Review*, 39-49.
- Hadjoannou, M. (2008, 8:2). How Does the Digital Matter? Envisioning Corporeality Through Christian Volckman's "Renaissance". *Studies in French Cinema*, 123-136.

- Hansen, M. B. (2004). *New Philosophy for New Media*. Massachusetts: MIT Press.
- Hawkes, T. (1977). *Structuralism and Semiotics*. London: Routledge.
- Kim, J.-H. (2009, 50:1). The Post-medium Condition and the Explosion of Cinema. *Screen* , 114-123.
- Koppelman, C. (2006, 4:1). Dust to Glory: A Film. *Computers in Entertainment*.
- Mangolte, B. (2003). Afterwards: A Matter of Time. Analog versus Digital, the Perennial Question of Shifting Technology and its Implications for an Experimental Filmmaker's Odyssey. In R. Allen, & M. Turvey, *Camera Obscura Camera Lucida: Essays in Honor of Annette Michelson*. Amsterdam: Amsterdam University Press.
- Manovich, L. (2001). *The Language of New Media*. Massachusetts: Massachusetts Institute of Technology.
- Mitchell, W. J. (1992). *The Reconfigured Eye: Visual Truth in the Post-Photographic Era*. Massachusetts: MIT Press.
- Negroponte, N. (1995, Jan 3). Bits and Atoms. *Wired*.
- Peirce, C. S. (1931-58). Volume 2. In C. Hartshorne, P. Weiss , & A. W. Burks, *Collected Writings*. Massachusetts: Harvard University Press.
- Roberts, A. (2002, 12). The Film Look: It's Not Just Jerky Motion... *R & D White Paper WHP 053*. UK: British Broadcasting Corporation.
- Rodowick, D. N. (2007). *The Virtual Life of Film*. Massachusetts: Harvard University Press.
- Rosen, P. (2001). *Change Mummified: Cinema, Historicity, Theory* . Minneapolis: University of Minnesota Press.
- Singer, I. (1998). *Reality Transformed: Film as Meaning and Technique*. Massachusetts: The MIT Press.
- Tech Target. (2008). *What is Soap Opera Effect (motion interpolation)*. Retrieved 06 07, 2011, from What Is?: <http://whatis.techtarget.com/definition/soap-opera-effect.html>
- Wikipedia. (2010, June 10). *Quantum*. Retrieved June 11, 2010, from Wikipedia: <http://en.wikipedia.org/wiki/Quantum>