The Part-Time Cognitivist: A View from Film Studies

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Abstract: Understanding how spectators interact with films requires some theory of filmic representation. This article reviews three such theories. The first, a communication model, assumes that an artwork constitutes or contains a message passed from a sender to a receiver. The second, a signification model, assumes that the film operates within a system of codes and that the perceiver applies codes to signs in the text in order to arrive at meanings. This conception of film as signification may be found in both classic structuralist and post-structuralist accounts. The third, an empirical-experiential model, assumes that an artwork is designed to create an experience for the spectator. This article argues that the cognitive approach to film studies is founded on the third model of representation. The article also traces the strengths and limits of cognitive film theory and its theory of representation.

Keywords: cinematic representation, cognitive film theory, poetics of cinema, post-structuralism, semiotics, structuralism

How do spectators engage with films? Within film studies, this has been considered a question about film as a system and process of representation. No decisive answers are forthcoming, but we have enough history behind us to sketch out three families of theories about cinematic representation. I do this while tracing some of their underlying assumptions about what representation involves. I follow my rather schematic outline with ideas about how the third family of theories has altered my own thinking about film.

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Three caveats: First, philosophers and empirical researchers won't find completely familiar ground here, though I suspect they'll recognize some overlaps. Second, some readers may ask why cultural studies, one of the most active research programs operating in film and media studies today, isn't represented in what follows. The reason is that many of its proponents seem to draw their working assumptions from either of the first two families I discuss. More broadly, I'm not convinced that cultural studies has a well-defined theory of representation

(Plantinga 2009b). Finally, I paint with a broad brush; there are many nuances I've had to set aside.

Communication and Signification Theories

The first family of theories I picked revolves around the concept of communication. I realize that "communication" is one of the slipperiest terms in our vocabulary, but I use it to refer to theories that treat cinematic representation as a process whereby a message is passed from a sender to a receiver. There is also a certain ambiguity in the concept of message as it's used in accounts of communication theory. Sometimes "message" stands for the physically delimited "text" that is transmitted, and sometimes it refers to the information or core content of that text. In the context of aesthetics, I think that the second usage is more common, so I follow that here.

Applied to moving pictures, the communication account would suggest that the plans and intentions of the filmmaker shape the movie, which becomes a vehicle for an embedded content. This frame of reference is probably the one that most people embrace in everyday life. It often comes into play in discussions of documentary films, particularly propaganda documentaries. Such films seem openly to promote a social message planned by the filmmakers for absorption by the audience. But even films less overt in their aims than, say, *Triumph of the Will* (2008) or *Fahrenheit 9/11* (2004), are often understood under the aegis of communication. What may be communicated is a set of facts, as in an instructional video, or a specific thesis, as in many documentaries about politics, business, and culture.

In *Enron: The Smartest Guys in the Room* (2005), it's assumed by many critics that the director, Alex Gibney, transposed the content already shaped by the authors of the book of the same name into cinematic form. Gibney's own ideas and concerns became part of the film's content. An interviewer asked how the film, along with the extras on the DVD package, "provided an opportunity for you as a writer, director, producer, human being to communicate your ideas to other people." Gibney replied that he was particularly interested in "grand cons" through which people in power convince others to do something that isn't in their best interests (Redwine 2006).

The communication model isn't relevant only to documentaries. Traditional film criticism has long assumed that fictional films, especially narratives, are vehicles for content packed in by writers, directors, and other creative personnel. What, the critic often asks, is the director "saying" or transmitting through the characters and their actions? Granted, the content may be conveyed more subtly than in a propaganda film. Of Clint Eastwood's *Letters from Iwo Jima* (2007), one critic writes: "The unspoken message of the film, which screenwriter Iris Yamashita penned in concert with *Flags* [*of Our Fathers*] scribe Paul Haggis, is that war is a battle of competing symbols and ideologies that

have no meaning. We create artificial divisions to hide the fact that we are all the same under the skin, with the same hopes, desires and fears" (Howell 2007). Whereas a propaganda film would have "spoken" its message, this film manifests it in and through the plot and characters. But the message, or what critics call the theme, remains.

Within this broad conception of representation we can pick out varying lines of thought. Instances of strict communication theory (e.g., information theory, cybernetics) aren't common in the humanities, but Roman Jakobson's (1964) more functionalist and pluralistic version has had some influence. Less explicit, the practicing film critic will refer to a message without invoking a concept of code and refer to a theme without any explicit loyalty to a theory of "thematics." The argument is pitched at a level of pragmatic common sense, but the underlying communication model is still operating.

A second family of theories is much more varied. I suggest that they share a model of representation as *signification*. Instead of conceiving representation as a message passed between human agents, this tradition conceives of it as a public, impersonal set of systems or structures. The prototype of this model would be French Structuralism. Representation here is a matter of signs and codes, organized in binary relations and governed by suprapersonal rules. This group of theories followed the linguist Ferdinand de Saussure (1966) in conceiving signification as matching of signifier to signified. The process was said to be governed by an applicable code, not necessarily reducible to the intentions of the sign-maker. If the message has a "sender," it is society or culture itself.

In the mid-1960s, theorists redefined the concept of signification in response to critiques of the sign undertaken by Lacan, Derrida, and others. The idea of constrained decoding was overthrown in favor of a view that sign systems were porous and fluid. A signifier didn't lock onto a signified, but rather pointed toward other signifiers that formed at best an expanding constellation of meanings. A fixed sign, a pure uniting of form, substance, and a differentially defined concept, was seen to be an illusion. What had been a fairly secure human sign-reader, a coherent decoder, became a phantom, something that was—according to some—no more than the contingent intersection of signs in play. Structuralism had been followed by post-structuralism.

To illustrate these two versions of signification theory, recall the changes in the thinking of Roland Barthes. In his *Elements of Semiology* (1970) Barthes speaks of signification as the act that "binds the signifier to the signified, an act whose product is the sign. . . . [The signified] is this 'something' that is meant by the person who uses the sign." The linguistic sign acquires an impersonal authority: "The link between the signifier and the signified is contractual in its principle, but . . . this contract is collective, inscribed in a long temporality" (Barthes 1970: 48, 51). Later, however, Barthes came to believe

that "nowadays semiology never posits the existence of a definitive signified. Which means that the signifieds are always signifiers for others, and reciprocally. In reality, in any cultural or even psychological complex, we find ourselves confronted with infinite chains of metaphors whose signified is always recessive or itself becoming a signifier" (1988: 199).

Without rehearsing all the debates of decades past, it's fair to say that a good deal of film studies from the 1970s to the 1990s adapted versions of signification theory. Scholars influenced by Barthes, the writers at *Screen*, and other advocates of post-structuralism conceived of a film as a "text." That text was an assembly of coded signs, but the codes were constantly dissolving under the pressure of ideological contradiction or a play of signifiers that resembles the dynamics of the unconscious.

Both families of theories share the assumption that spectatorial engagement is a matter of meaning. A message or a signified (even an elusive and infinitely deferrable one) is a bit of conceptual content. Signification theory harnessed all else that might engage us in a film—an array of light and color, a recognizable human being, the dynamics of a plot or the tingle of music, the thrill of a scene or a resolution—to a fairly abstract conception of meaning. Processes of arousal, attention, inference, pattern-making, and affect, if they were noted at all, were relegated to the side of the signifier, becoming mere vehicles for the message, or for higher-level ideological or cultural or psychodynamic signifieds. In this respect, both communication- and signification-oriented families of theories were compatible with the reading strategies of traditional filmic interpretation. True, a post-structuralist reading would differ from a structuralist or communication-oriented one in the meanings that are constructed, but the habit of treating the texture and structure of the film as pathways to large-scale meanings was common to all.

I think that some researchers in the post-structuralist tradition recognized the problem of emphasizing the signifier's role while playing down its material and affective properties. Hence essays were written about the mysterious appeal of "the grain of the voice," or "cinematic excess," or untamed *pulsions* rippling through the text (Barthes 1977). But these textural qualities were largely evoked in belletristic prose rather than subjected to empirical analysis.

It is also important that for many in the structuralist and post-structuralist families, language served as the paradigm cases of semiosis. De Saussure's analysis of the linguistic sign provided the core doctrine of both traditions, and literary theory became central to the humanities, providing models for theorists of music, the visual arts, and even architecture.

Verbal language became a model in another way. If filmic representation is a matter of codes—tightly structured or ceaselessly fraying under the friction of the signifier—then presumably the effects of film are the results of something like learning a language. For the structuralist, the prototypes were the

code of phonology or lexical semantics; for the post-structuralist, the proto-type might be the code of gender difference. Either way, the crucial structur-ing differences were given by culture, not nature, and people acquired them through socialization. Adherents of these positions were eager to argue that—as with language—biology and its evolutionary implications played no crucial role in cinematic response. Culture, as was sometimes said, went all the way down.

Signification theorists' fixation on signs, codes, and textual dynamics tended to rob the film viewer of an interesting mental life. The writers played down the fact that a spectator is endowed with a mind capable of perception, memory, judgment, inference, imagination, and the like. Some proponents of a signification account would probably say that their accounts weren't aimed at explaining the activities of empirical spectators but rather at the subject positions that could be "occupied" by empirical spectators. But activating those positions rests in turn on capacities that "the text" presumes spectators to be exercising.

How might a theory of cinematic representation take mental activities into account? We can start by saying that films are made for people to acti-vate. Viewers' experiences rely on the ability to see and hear, to recognize and recall, to frame expectations and to be surprised when those are fractured, to judge what's presented and then rethink that judgment. The output isn't a message or a passage among signifiers, but an experience.

This may sound like an appeal to subjective, or at least phenomenological, criticism. And perhaps one has to start there. But at some levels there are regularities and convergences among spectators' experiences, and those reg-ularities are subject to something more analytically probing than phenome-nological reflection. We can try to explain them. We can experiment upon them. We can provide a functional analysis of them. And we can find histori-cal precedents for them. Moreover, the designs and patterns that create those regularities are not just embedded in the text as one-off features. The designs and patterns recur because they have been proven to achieve particular re-sults. For example, fast cutting can pick up the pace of viewer uptake; direc-tors discovered this in the 1910s, and it has been a reliable design principle ever since.

In other words, what if we conceive of filmic representation as aiming to shape the experience of a spectator equipped with psychological faculties? This prospect opens the possibility of a third family of theories.

A Third Way

What to call it? I've considered the "cognitive" perspective, or the "naturalis-tic" perspective. Although either will satisfy some readers, I've opted for awk-wardness and named this family of theories the *empirical-experiential* one.

All three families I'm delineating include researchers who explore cinematic representation under the principles of empirical and rational inquiry. They try to identify and explain regularities in viewers' responses to films. But for the third family, those regularities are typically activities—processes of perception, comprehension, emotional response, and more abstract appropriation. Meanings of the sort identified by the other families are part of the story, but not the whole story. More basic questions intrude. How do we grasp a shot's three-dimensional array? How do we know who the protagonist is? How are we to judge characters' actions? How does a melodramatic situation appeal to the audience's emotions? Sympathizing with a corrupt character may lead us to a certain thematic statement; but what processes enable the film to mobilize our sympathy in the first place?

The empirical-experiential family of theories displays some affinities with other theoretical trends. Like classic communication theorists, researchers in this vein tend to assume an intentional agent structuring the stimulus for uptake. But they do not share the idea that all aspects of cinema can be understood as the embedding of abstract content in a material vehicle. Like signification theorists, they are willing to grant that spectators can construct meanings that the filmmaker never intended. And like signification theorists, my empirical-experiential family tends to assume that learning plays a central role in grasping some of the regularities we encounter in films, such as certain conventions of storytelling. But this family of theorists also gives considerable sway to any innate or quickly learned abilities that play important roles in making sense of movies. We should expect that the activities of spectators include a large dose of "bottom-up" processes—those fast, spontaneous, quickly learned or never learned processes that eventuate in grasping this as an image, or a person, or a bit of speech, or a lyrical musical phrase (Bordwell 2008b).

This third family of theories focuses on the dynamics of cinematic experience—conceived, as I've mentioned, as regularities of activities executed by a population of moviegoers. Sometimes these regularities are measured rather precisely, as in Uri Hasson and colleagues' "neurocinematics" and Tim Smith's (2007) studies of shot scanning. Sometimes, though, the regularities are presupposed by a sort of reverse engineering. The researcher locates a widely shared effect prompted by a film, such as suspense, and then hypothesizes that particular design features promote it. Picking out those design features, such as a deadline in the plot or the use of tense music, allows us to specify further what perceptual, cognitive, and affective activities are promoted around the central purpose of enhancing suspense.

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How is talk like this new? Isn't it what critics have always done? Yes, but they have seldom sought inspiration from the

sciences of the mind. Hence the other half of my label, "empirical." I don't mean this term to refer only to laboratory experimenters. It's clear that a great many humanists in my third family are empirical in their appeal to argument and evidence, and they join scientists in a commitment to rational, inductive inquiry. More specific, both humanists and experimenters seek answers to questions of moving-image media by drawing selectively from ongoing research in cognitive science, including psychology, neuroscience, and evolutionary theory.

Over the last fifteen years several film scholars have drawn on these research domains to clarify cinematic representation (Anderson 1996; Grodal 1997, 2009). At the same time, experimentalists have been drawn to moving-image media not only as research tools but also as subjects for investigation. Psychologists have long inquired into the arts, trying to turn mysteries into concrete problems. The cognitive paradigm was brought to bear on film most extensively by Julian Hochberg ([1966] 2007; Hochberg and Brooks 1996). The tradition continues in Levin and Simons's (1997, 2000) examination of mismatched details of shots, and James Cutting and colleagues' (2010) analyses of editing clusters.

One primary assumption sets this research program apart from other theories. Both communication theories and signification theories put codes at the center of concern. There is endless debate about how "natural" or "arbitrary" codes are, but there is a strong tendency to assume that codes operate as closed systems, with internally structured rules that must be acquired through socialization. (Again, the model of verbal language hovers over this line of thinking.) The early structuralists set strictly arbitrary codes against analogically motivated ones. Verbal language was the model of an arbitrary system, while pictures coded analogically, by resemblance to the referent. But soon theorists were arguing that even analogical signs like images were not "naturally" motivated and could be considered as arbitrary as words (Eco 1976, Metz 1972). This supported the cultural relativism that was characteristic of post-structuralism: There are no natural signs. Everything is socially constructed—that is, culturally coded—and so every sign system sets up distinct rules, which are likely to vary dramatically across cultures and within subgroups.

By contrast, researchers in my third family tend to embrace the assumption that a great deal of the film experience draws on non-filmic capacities and skills, many of which are acquired in ordinary experience (Messaris 1994). No code, in any meaningful sense, governs the perceptual act that forces us to see motion in movies; the rate of projection plays on a deficiency of our visual system. No code seems required for us to recognize things in images: infants recognize their mothers in video displays (Dissayanake 2000). Understanding a room's geography as presented in a series of shots, or grasping that a char-

acter is unhappy, or discerning the events that lead up to a crime—at a basic level these activities tap our ordinary abilities to make sense of space, facial expressions, causal sequence, and social exchanges.

From this perspective, filmic conventions aren't invented out of whole cloth but rather piggyback on what we can already do. Films refine and re-shape and sometimes overturn our normal processes of interacting with the world physically, emotionally, and socially. This is why my third family could be called "naturalistic." It starts from the assumption that we bring to film all our capacities to make sense of the world around us (Bordwell 2008a).

This isn't to say that we are fleshly computers following perfectly rational programs. We have inductive skills that will often lead us to veridical under-standing. But we are also imperfect reasoners, swayed by heuristics and biases that can mislead us (Ariely 2008; Brafman and Brafman 2008; Kahne-man, Slovic, and Tversky 1982; Tavris and Aronson 2007). Storytelling plays on both our strengths and weaknesses. When a film asks us to read facial expres-sions, we're typically quite proficient. But we are prone as well to the funda-mental attribution error, the tendency in real life to assign the causes of behavior to personality traits rather than to circumstances (Ross 1977). If I'm grumpy it's because I've had a bad day; if he's grumpy, it's because he's a grump. Storytellers play on the fundamental attribution error by introducing characters at moments when they are exhibiting traits that will be important for the action to come. Sometimes the storyteller tricks us by introducing a character who strikes us one way but who turns out to be a rather different sort of person. But here the fundamental attribution error is no less operative; it's simply recruited for the purpose of creating a narrative surprise.

Some of the skills and biases of sense-making are culturally specific. Full understanding of what's happening at the start of *Late Spring* (1949) requires knowledge of the tradition of the tea ceremony and awareness of the ten-dency in postwar Japan for well-off ladies to indulge in it (Figures 1–3). But

Figures 1–3. The tea ceremony in Ozu's Late Spring.

these "codes" of Japanese life ride on much broader capacities. Any viewer can recognize humans, grasp spatial and temporal relations, detect purposeful human action, understand certain facial expressions, build expectations, and the like. If the empirical-experimental family of theories seems to play down culturally specific conventions, it's because of the assumption that these rest on a foundation of capacities and skills that are transcultural, if not universal (Bordwell 2008a). It seems likely that any given film is a package of appeals, with many of them very broad and others narrowly accessible; and the latter seem to ride on the former. Divergence in viewer response seems to depend on a more fundamental convergence.

As a representation, a film can be thought of as a vehicle for a message, or a system of signs to be decoded or unraveled. The family of theories I'm considering now takes a film as an experience kit, a pattern of prompts and prods that encourages the viewer to elaborate on what is given. Sometimes the path of elaboration is foreseen by the filmmaker; in that case we have the prototype of successful "communication" (Sperber and Wilson 1986). But sometimes viewers spontaneously infer things that weren't intended; this is common in the case of thematic readings. In all instances along the spectrum, we are dealing with a patterned process of perceptual or inferential elaboration, not the unwrapping of fixed content. The regularities and exceptions, the convergences and divergences, are open to rational, empirical inquiry. This, more or less, is what I conceive cognitive film studies to be.

On Not Ironing Out the Wrinkles

This isn't my first effort to lay out the premises of a cognitive approach to film studies; the first dates back to 1989 (Bordwell 1989). That essay expressed a degree of caution about letting one's research be dictated by wide-ranging theoretical systems. The following explains that reservation in personal terms. Having sketched these three families of theories, I now want to back away from the big canvas and consider the usefulness of working on a smaller scale—not quite a miniature, but something at least portable.

My reasons go like this. The further up the ladder of abstraction and generality we climb, the less we're inclined to notice quirks, disparities, and exceptions in the things we study. If we pitch our questions at a certain level of generality, we're likely to notice only those general aspects of the film that exemplify what we postulated. Thus an evolutionary psychologist may focus on aspects of character relationships that are congruent with reciprocal altruism, kin bonding, and the like. This can be illuminating, but it risks overlooking what is distinctive about the film within cinematic traditions. There's much to be said for starting more concretely, with puzzles that grow out of one's expertise in a particular domain. This isn't a plea for the irreducible singularity of each film; we still want generalizations. But by starting with smaller-scale

problems ingredient to cinematic research, we may arrive at generalizations that are more tightly contoured to the artistic specificity of filmmaking.

For an analogous case of this strategy, we can turn to the writings of the art historian E. H. Gombrich. He did not shirk large issues, but his exploration of them was always tethered to a concrete research problem in his discipline. Why do Renaissance artists develop lateral, or "grazing" light? What can explain the development of shadows in art? Why does a glint in an eye render a face more vivacious? (Gombrich 1973, 1976, 1995). Each of these questions led Gombrich to explanations that were shaped by experimental psychology of his day: how stimuli are disambiguated, or the ways in which illusions can grip our minds.

Where philosophers might start with grand questions—What is an image? or What is art?—Gombrich the historian launches *Art and Illusion* (1969) with a deceptively simple question: Why does Western representational art have a history? That is, given that we all see the world more or less the same way, why didn't the earliest artists simply copy what they saw? His efforts to answer that question coaxed him toward research in the nascent field of cognitive psychology. The concept of perceptual schema, for instance, led him to the hypothesis that "making precedes matching": that is, just as early stages of visual perception work with simple forms, the artist needs a conventional, even skeletal image to revise and shape. Likewise, Gombrich's concept of the "beholder's share" in disambiguating images owes a great deal to the emerging idea that in order to interpret everyday visual experience we "go beyond the information given" (Bruner 1973).

> *Perspective creates its most compelling illusion where it can rely on certain ingrained expectations and assumptions on the part of the beholder. . . . Assuming as we must that the pavements are flat and the tiles identical units, we are compelled to read their progressive diminution as recession. But here, as always, the impression of depth is entirely due to our share, our assumption, of which we are rarely aware. (Gombrich 1969: 261)*

Gombrich was particularly impressed by Adelbert Ames's demonstrations of the contingent nature of vision. You see an Ames scene through a peephole, but when you examine the layout of the items from other angles, you realize that it's a jumble that coheres around only one point (Ittleson 1952).

Gombrich would later go on to collaborate with R. L. Gregory, the Helmholtzian researcher into illusions. He was also influenced, in a roundabout way, by the ecological theories of J. J. Gibson. Gibson criticized the "snapshot theory of vision" held by traditional psychologists and their cognitivist heirs. Everyday perception, Gibson argued, is geared toward action—our action and the environment's action. Through the optical flow we perceive in moving

through the environment, the world furnishes us accurate information about a three-dimensional layout (Anderson and Anderson 2005; Gibson 1966). But Gombrich replied that naturalistic painting strives exactly for snapshot vision; as with any two-dimensional array, the information it offers is necessarily degraded and incomplete. Grasping a painting therefore depends on assumptions, expectations, and guesswork to a degree that we often don't deploy in everyday life. Looking at a picture is a bit like trying to make out a scene in a fog or at dusk (Gombrich and Erebon 1993).

I'm not competent to judge Gombrich's hypotheses about the nature of image-making (though I do find them plausible). I merely want to highlight his research strategy. He started with concrete research problems he inherited from his discipline. Assessing the available answers, he realized that ideas and information from another field could help him toward better solutions. As his career went along, he was able to clarify, disconfirm, enrich, and expand the congruencies he discovered between art history and the psychology of vision. The result may not add up to a "psychology of art"; indeed, he was skeptical of systems. Here the relevant contrast is probably Rudolf Arnheim, who didn't hesitate to theorize on the grand scale. Gombrich would never have written a book called *Art and Visual Perception* (Arnheim 1979). Without ever proposing a "cognitive theory of visual art," he offered fresh and challenging explanations of specific matters in his domain of expertise.

I confess that Gombrich's type of interdisciplinary exploration suits my temperament. In my earlier overview of how cognitive science can illuminate problems in film studies, I proposed that we should not try for a *Weltanschauung* that seeks to rival psychoanalysis or semiotics. Elsewhere, I've argued that progress in any field benefits from focusing on middle-range problems rooted in a discipline (Bordwell 1996). These are problems that are neither simply items of fact nor vast philosophical teasers; they are rooted in empirical issues but have, inevitably, broader conceptual implications. Examining such middle-range problems amounts to what Noël Carroll calls "piecemeal theorizing," the focus on "small-scale, delimited questions" (1996a: 58).

These are problems that are neither simply items of fact nor vast philosophical teasers; they are rooted in empirical issues but have, inevitably, broader conceptual implications.

My own areas of interest have been aesthetic ones—film form, film style, and the activities they summon from spectators. In many instances, the questions I wanted to pursue in these areas had little or no resonance in areas of psychology. As far as I could see, studying the films of Ozu and Dreyer didn't press me toward issues of how the mind worked. Nor did my studies of Hollywood cinematography practices. Examining Eisenstein's career did thrust me toward the history of psychology in the Soviet Union, but that peculiar mix of reflexology and "dialectical" thinking shed light chiefly on the director's theo-

retical arguments. But other questions urged me to trespass into the realm of psychology.

A simple example is a paper I did on eye behavior in film (Bordwell 2008c). I started by noticing actors' tendency to stare unblinkingly at each other. Since 1975, despite endless discussion of the cinematic gaze, no one, as far as I could tell, had noticed some peculiarities of looking that actors displayed in movies. This led me to read actors' autobiographies. There I occasionally discovered that they tried to rivet their attention on the other players. I then looked into research on the psychology of interactions. I found that in ordinary life our eye behavior differs considerably from that we see in film: Film characters stare at each other and blink far less often than is normal, and this seems to hold good in films from many cultures. I hypothesized that this sort of behavior fulfilled narrative functions—to signal that events of moment were occurring, to indicate shared attention, and to punctuate phases of the dramatic interaction. Just as important, blinking was taken as a performance element, not the natural lubrication of the eye. The character who blinks is surprised, or fearful, or nervous. In film, actors' eye behavior simplifies and sharpens certain aspects of ordinary eye behavior. Not earth shaking, but a discovery nonetheless, which in turn suggested some bigger generalizations about how film performance reshapes ordinary social behavior for quick pickup.

More extended forays into cognitive science likewise arose from questions that nagged me. How do various filmic traditions tell stories? I wanted to explore the narrational strategies that had emerged at different points and places in history. But in order to provide a principled account of how films pass along information, shape our understanding of action, filter what we learn through characters' knowledge, and so on, I had to assume that spectators were capable of following all these processes. That prompted the question: What sort of activities did the viewer have to perform?

From 1982 to 1984, some discoveries in cognitive psychology seemed to me to be pointing toward the skills that film narratives demand. Meir Sternberg (1978) had already made rigorous use of the "primacy effect" in explaining certain expositional strategies in fiction—again, not through gross borrowing, but creatively extending psychological findings to a project specific to his discipline. Taking a hint from Sternberg, I found myself doing what later writers would call reverse engineering. My analysis of a film disclosed patterns that functioned as cues for uptake. Those cues were designed to be picked up by a human mind inclined to "go beyond the information given," to exercise memory, anticipation, judgment, and other faculties. The constructivist model of story comprehension that resulted (Bordwell 1985) could also have been called *Film: Some Assembly Required*. It was my first effort to try to capture the regularities of the film experience, through a psychologically functionalist account of formal conventions.

The other large-scale "cognitivist" project I worked on was an outgrowth of both the narration book and, more unpredictably, *Ozu and the Poetics of Cinema* (Bordwell 1988). Reading everything written about Ozu I could find in English and French, I was struck by the repetitiveness not just of what was said but how the interpretations worked. There was, I came to think, a rhetoric of film criticism, with its own traditions, topoi, and set arguments. But how did critics arrive at the conclusions they clothed in rhetoric? What mental models and reasoning routines could give critical essays their particular shapes?

Having considered filmic comprehension in cognitive terms, I saw that I could cast interpretation along similar lines. I'd argued for narrative schemas, inferential heuristics, and expectation as crucial to film viewing. *Making Meaning* (Bordwell 1989) proposed that kindred but higher-level, more deliberative cognitive activity was at work in film criticism. And just as different modes of filmic narration called for different viewing skills, so different critical institutions—journalistic, academic, and the like—encouraged appropriate patterns of inference and rhetorical presentation. One of my conclusions surprised me: The doctrinal schools of interpretation (humanistic, Marxist, psychoanalytic, phenomenological, etc.) were similar in their reasoning patterns. They plugged different semantic fields into the same "logic" of critical inference and persuasion.

I now think that these two books, whatever their usefulness, may be too complicated. Both could be streamlined conceptually. It's also likely that some aspects of the account of film viewing in *Narration in the Fiction Film* are psychologically unrealistic (Hochberg and Brooks 1996). In any case, I was bitten by the cognitive bug, and the rash hasn't gone away. Ever since, I find that research projects with little direct connection to cognitive science still take on that tint.

An example is cinematic staging. Scholars have expended a great deal of analytical effort on film editing, but there were virtually no studies of how directors arranged and moved actors within the frame. The usual idea was that staging was inherently theatrical and so not cinematic, hence not much could be said about it. Kristin Thompson (1995) first called my attention to aspects of expressive performance in films of the 1910s. At the same time, my colleagues Ben Brewster and Lea Jacobs (1997) were immersed in studying acting styles of the period. Thanks as well to Yuri Tsivian's (1992) exploration of painterly traditions in early film, I became interested in ensemble performance and composition of the frame in the 1910s. While watching some films from that period I began noticing that figures were being moved around the frame according to their prominence at any given moment. One might be central and shift to the side; another might be in the background and come forward; one might turn from the camera. More delicately, one figure might

block another, only to reveal the second actor at a crucial moment. I tried to reverse-engineer the images: What is this composition doing at this point? What is the composition doing a few seconds later? I discovered that even a slight change in the array of figures would shift our attention to a new item in the frame (Bordwell 1997, 2005).

I went on to itemize the various parameters that could be exploited: frontality, movement (especially to the foreground), size in the picture format, and so on. The artistic result, I tried to show, was a complex choreography. Once you notice the filmmakers' decisions, they become intuitively obvious. But I find it satisfying that our pretheoretical intuitions and my analysis of the scenes are consilient with discoveries about saccadic eye movements and centers of interest. It's the same lesson as the blinking essay: Filmmakers proved to be practical psychologists. Through tradition and trial and error, they were able to guide ordinary behavior in ways that created an aesthetic experience.

In sum, it seems to me especially rewarding to shuttle between concrete problems and larger issues. I take a comparable satisfaction when other film scholars do the same, as when Noël Carroll (1996b) starts from a question about how suspense works and frames an answer in cognitive terms. Or when Carl Plantinga (2009a) and Murray Smith (1995) ask how films express emotion and seek answers both in the details of the films and in the psychological literature.

You don't have to be a cognitivist 24/7. Not every problem responds to an empirical-experiential solution. But in many domains this family of theories opens the prospect of more powerful and nuanced explanations. Whether pitched at a general or a more concrete level, thinking along these lines has enabled us to begin answering questions about how films work and work on us.

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