Embodied Cognition and Cinema

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We had the experience but missed the meaning,
And approach to the meaning restores the experience
In a different form, beyond any meaning
We can assign to happiness.

T.S. Eliot, *Four Quartets*
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INTRODUCTION
Establishing an intimate relationship between fictional characters and the viewer is of primary significance to the narrative film. In this chapter, I conceive film viewing as a quasi-intersubjective relationship between the viewer and the (main) character – two bodies involved in a physical, mental and emotional experience, while mediated by a third quasi-body: the film. To explore the nature of this complex relationship, I adopt a phenomenological perspective and rely on the notion of cinematic empathy: a pre-reflexive and ‘immediate’ psycho-physical process through which the viewer experiences a character’s perceptions, thoughts, actions and emotions via embodied simulation. When conflating the bodily expression of the character and the bodily perception of the viewer, a ‘shared experiential space’ emerges. My analysis of a scene of Alfonso Cuarón’s space-exploration film Gravity (2013) untangles this notion, placing particular attention on the character’s physical appearance and behaviour (e.g., body postures and facial expressions) in relation to the viewer. My starting point is a phenomenological account of cinematic empathy and an ‘embodied’ conception of simulation offered by Belgian experimental psychologist Albert Michotte van der Berck, and subsequent exploration of relatively new assumptions from neuroscientific research.

1. EMPATHIES AND SIMULATIONS
1.1. Cognitive account of empathy and mental simulation
Film studies, as a discipline, has evolved by expanding its interdisciplinary focus. For instance, the notion of empathy, which emerged at the turn of the 20th century in psychology, has been introduced within the analysis of film. Empathy can be defined in numerous ways, depending on the discipline and theoretical context that frames its use – analytical or phenomenological
philosophy, Neo-Romantic aesthetics, cognitive psychology, psychoanalysis, neuroscience, etc. All accounts of empathy, however, address pre-reflexive and immediate forms of human knowledge and mutual comprehension. Cognitivist film scholars describe empathy as a psychological process related to mindreading and perspective-taking activated under precise conditions (e.g., Bruun Vaage; Coplan “Catching”; Grodal Moving; Plantinga “The Scene”; Smith, M.; Tan). At the core of their account on empathy is the notion that viewers interact with characters as if they are real people, bestowing characters with consciousness and intent (Dennett). These dynamics also draw on the notion of mental simulation, in which the viewer adopts the characters’ perspectives and deliberately reproduces their mental states.¹

1.2. Filmological empathy
In 1953, Michotte noted that empathy might curtail the psycho-physiological distance between the viewer and the fictional events on-screen, thus compensating for the ‘gap’ between direct and mediated experience. He described empathy as an immediate form of experience: “when we observe what someone else is doing and we ourselves live it in some sense, rather than just understand it at an intellectual level” (“Emotional Involvement” 209). He distinguished between two different, yet strictly connected, kinds of empathy: motor and emotional. Motor empathy, which unfolds progressively, precedes and accompanies emotional empathy: a structural homology allows viewers to project their bodily movement onto the character’s. Michotte describes cases in which there is no empathy: the perceived movement and the viewer’s motor reaction are clearly separated, evidencing a gap between visual impressions and their tactile-kinaesthetic correlates; this translates in an emotional disconnection between the character and the viewer. Naturally, not every film experience entails sensory-motor or psycho-affective involvement; in these cases, there is no decrease in (what Michotte calls) the ‘segregation of spaces’: the viewer’s experience consists solely of witnessing a fictional world that remains clearly distant and separate.

At the most basic level of empathy, the viewer’s movements synchronize with those of the character, for instance following a musical or dance rhythm with foot-tapping. Or for instance, some accidental or casual reason may connect the emotions of the viewer and those of the character, as when criticisms from one character to another pertain to the behaviour of the viewer; the viewer is thus directly affected by such criticisms, albeit due to a motivation
external to the film. Outside film, a similar situation emerges with interactions like “I join in your joy,” or “I share your pain,” triggering a physiological activation in the form of pre-empathy. However, this form of basic activation must not be confused with empathy.

Motor empathy occurs when the viewer reproduces the observed movement, such as assuming a facial expression similar to that of the character. This imitation takes place at the musculo-skeletal level and appears less pronounced than that of the body that performs the movement. This mirror-effect does not result in a fusion of inner states; rather, there is a single action presented in two different forms (visual and proprioceptive), belonging to two distinct subjectivities. This corresponds to the successful and effective empathetic relationship between the viewer and the character of a narrative film. Even in the presence of shifts in levels of empathy resulting from interfering factors (such as viewers’ tiredness, low level of attention, state of mind), psycho-motor correlations between motor and mental states preserve the separation between the viewer’s and the character’s subjectivity. The sharing process does not result in absorption or substitution, but remains as ‘contact at a distance.’

In extreme cases a clear fusion of subjectivities occurs. Viewers place themselves in the skin of the character: there is not only a single motor action, but also a single ‘moving I’ (Michotte “Emotional Involvement” 210-211). In this case, there may be a deep identification between the viewer’s persona and that of the character, in terms of both motor imitation and emotional absorption. As a result, an absolute fusion is achieved: the total assimilation of subjectivities stems from viewers losing self-awareness and fusing their egos with that of the character (Michotte “Emotional Involvement” 214-215). In this case Michotte explicitly refers to psychologist Theodor Lipps and his neo-Romantic account of Einfühlung, that is, a projection of the viewer in the observed action: viewers feel inside characters resulting in a fusion of consciousness. This fusion is achieved via “inner imitation” as the observer internally reproduces the movements of the observed person. Perceived movements are instinctively and simultaneously mirrored by kinesthetic ‘strivings,’ activating corresponding feelings in the observer (Lipps 121-126).

Leaving aside the neo-Romantic account of Einfühlung, Michotte’s description of empathy is useful to us for two main reasons. First, its stratification allows us to distinguish empathy from other forms of character-viewer relationship: mere synchronization and extreme identification. Second, the conceptual distinction between motor and emotional empathy helps to con-
nect sensory-motor movements to feelings, mental attitudes, judgements, and thoughts. In light of Michotte’s account of empathy, we can assert that cinematic empathy is a psychological phenomenon that connects the sensory-motor and the psycho-affective dimensions of the viewer’s perception. Within the cinematic environment, viewers’ involvement entails both motor and emotional participation despite their awareness of the fictional nature of the filmic events. This participation is mostly achieved via the activation of empathy, reducing the psychological distance between viewers and characters (D’Aloia “Cinematic”).

1.3. Neurological empathy
Relatively recent discoveries in neurocognitive research offer a description of empathy akin to that of Michotte. Much experimental research reveals that the human brain architecture allows for the pre-reflexive comprehension of goal-directed actions and intentional emotions. This immediate comprehension is possible by the activation of brain cells located in the ventral premotor cortex (area F5) in primates. The so-called ‘visuomotor neurons’ (i.e., ‘canonical neurons’ and ‘mirror neurons’) respond during both action-execution and object-presentation, regardless of whether the subject is anticipating, imagining or watching someone else performing the action. The immediate comprehension allowed by neural activation thus relies principally on an intimate connection between action and perception (Iacoboni Mirroring; Rizzolatti and Sinigaglia).

Visuomotor neurons provide an opportunity to extend film viewership theory: neurocognitive findings permit new interpretations of the psychophysical participation of the viewer in relation to the character’s actions, thoughts and emotions, for the film experience is an intensified sensory stimulation that does not correspond to any explicit motor activation in the viewer. In other words, the neurological nature of empathy provides a basic embodiment of these feelings and sensations perceptually expressed, where the notion of embodiment indicates both metaphorically the embodiment of the meanings of the character’s actions and emotions, and literally the incorporation in the viewer’s body of synesthetic and sensory-motor sensations and feelings.

Departing from a traditional cognitive theory of mind, neurophenomenologists claim that this immediate and automatic comprehension of meaning (of observed or imagined actions) results from a simulation described as embodied – that is, an ‘internal representation’ of the observed action (Gallese “Embodied”, “Mirror Neurons”). Embodied simulation does not entail inference of mental states or an imaginative substitution. Rather, it is pre-logical and
pre-reflexive, rooted at the sensory-motor and neurophysiological level. The embodied-simulation hypothesis provides empirical evidence that the viewer witnesses the actions represented on-screen while internally acting out and simulating the intentional actions performed by a character. The functioning of mirror neurons is framed as the neurophysiological ability to understand the meaning of others’ actions and state of mind – that is, empathy (Carr et al.; Gallese “The Shared”, “The Roots”; Iacoboni et al.). This ‘mirror mechanism,’ as neurological correlate to understand the character’s intentions and inner state, can relaunch the debate under a new and more radical (i.e., embodied) conception of simulation in the film experience (Gallese and Guerra “Embodying”; Grodal Embodied).

Neurophysiologist Vittorio Gallese frames the hypothesis of embodied simulation within the paradigm of embodied cognition (Johnson; Lakoff and Johnson; Varela, Rosch and Thompson). In the wake of Maurice Merleau-Ponty’s notion of body conceived as a combination of a physical structure (the biological body) and an experiential structure (the living, moving, suffering, and enjoying body), this paradigm in cognitive science grounds cognitive processes in the neuroanatomical substratum of the brain and substantiates cognitive processes from an organism’s sensory-motor experience.

2. A CASE STUDY: GRAVITY

2.1. Spacewalks

To understand better how the paradigm of embodied cognition may enrich the analysis of the character-viewer relationship in the film experience, the second part of this chapter applies the model of cinematic empathy to a scene from Gravity. The space exploration genre is unique in the portrayal of the environment the characters inhabit: invalidating the force of gravity. In ‘gravitational’ situations, gravity is a force that orients the action and intentions of the character. In so-called ‘space walks,’ that is when astronauts engage in extra-vehicular operations, relativity of orientation reaches its maximum, because the diegetic environment justifies invalidating gravity. The fundamental hypothesis is therefore that space exploration films, especially during space walks, are able to communicate the sense of suspension, dizziness and disorientation more effectively than ‘gravitational genres.’

This impression stems from conflicting bodily orientations: that of the character, that of the viewer, and that of the film as mediating the first two. The film plays with variable alignments and misalignments in two basic
steps. First, a phase aimed at perturbing the viewer’s perception – this is a phase of disembodiment of perception, ‘detachment’ from corporeality, ‘dissociation’ from natural alignment, as a result of being disturbed by the manipulating forces generated in the fictional world. Second, a phase of ‘re-attachment,’ a re-embodiment dynamic, aimed to redress the balance, the sense of position, the readability of movement, the emotional continuity and the intentionality of action.

2.2. Point of no return

Cuarón’s *Gravity* exemplifies the proposed two-step dynamics. Cuarón designed the film to immerse, or rather suspend, the viewer in a state analogous to the character, a state of vulnerability, fatality, and irreversibility of expulsion onto space. In the film, the strategy of engagement emphasizes archetypical situations and solutions typical of space-exploration-film style. *Gravity* marks a caesura, a point of no return in the history of the genre; the suspense is literally and bodily experienced (thanks to the skilful use of 3D). All formal solutions are fully functional to the transmission of the character’s psychophysical relativity to the viewer. *Gravity* is an action film where action is progressively frustrated: the story centres on difficult to achieve tasks, on the lack (and the loss) of points of reference, and on the continuous risk of suffocation. All of these physical demands are effectively transmitted to the viewer, who experiences immersion in fictional space, therefore empathetically experiencing the character’s difficulty in moving or breathing. The proximity between the physiological condition of the viewer and that of the astronaut heightens the sense of limitation and frustration caused by the inability fully to control movements. The cumbersome space suit works as a medium that allows an otherwise impossible experience and, at the same time, keeps a distance between the body and the external environment. The padded gloves of the space suit, for instance, greatly reduce the ability to grip surfaces, to grasp objects, to grab footholds (D’Aloia “The Intangible”).

In the ‘triggering event’ scene, at the end of the long opening sequence, Dr. Ryan Stone (Sandra Bullock) and lieutenant Matt Kovalsky are outside the space shuttle Explorer to repair a malfunctioning unit. While Stone is attached to a mechanical arm of the shuttle, Kovalsky is free from any physical connection to the shuttle but equipped with jet-packs that allow him to direct his movements. Suddenly, a rain of debris collides with the spacecraft. The shuttle begins to rotate dramatically, the debris hits the mechanical arm; this causes it to detach from the Explorer thus casting Stone adrift. Shortly thereafter, encouraged by radio transmission from Kovalsky, Stone manages to break away.
from the mechanical arm, but continues to rotate adrift. The rotation of the shuttle transfers to the mechanical arm after its detachment, and the rotation of the arm transfers to Stone after her detachment. Stone’s movement therefore combines two types of motion: translation in the depth of space (a linear displacement), and rotation around its own barycentre (a spiral-like, recursive and ‘reflexive’ movement).

In the complex system of outer space, in which bodies are in constant and reciprocally influenced motion, the character and the viewer establish a relationship akin to that between the character and the camera. To this end, the shooting techniques of *Gravity* are unique; these take place in a light box wherein actors hang from wires to perform choreographies while suitably lit in relation to a light source (emulating the sun); pre- and post-production adjustments via computer software allow for the perfectly simulated extra-atmospheric setting. These techniques allow new compositions of the character-viewer bodily relationship through the mediation of the ‘film-body.’ With these premises in mind, I turn to a detailed analysis of a sequence within *Gravity*.

### 2.3. Celestial motions

Debris hitting against the shuttle causes it to spin, and the mechanical arm to which Stone is attached spins along too. At this moment, the frame is mostly static, showing the entire structure rotating along the horizontal axis of the screen. Three-dimensionality is emphasized as the character, located at the tip of the arm, passes in front of the objective, departs from it, and continues to swirl.

When debris hits the arm and causes it to detach from the shuttle, the arm (and Stone attached to it) wildly rotates away from the shuttle. The frontal point of view makes this motion imperceptible, as it is directed toward the camera: the profilmic movement is thus ‘neutralized’ as the camera recedes. This time, rotation is perpendicular to the screen. After a few ‘flips,’ Stone passes near the camera, which now has slowed its backtracking. Exactly in this moment, the camera ‘attaches’ to the character’s rotation: the camera now embodies both the character’s translational motion in space and her rotation. Given that she continues deeply into space, translation and rotation combine. Yet, this double move is not perceivable, because the ‘attachment’ has ‘stabilized’ the character at the centre of the frame. By ‘fixing’ the image, the film allows the viewer to see the character’s face reflected on the helmet’s visor, along with her tension and emotions. The only object that ‘moves’ on-screen is the background: the Earth surface appears and disappears cyclically behind the character.
Figure 1.
The camera moves slightly lower from Stone’s face to her gloved hands, as she attempts to release the clip that attaches her to the mechanical arm. She succeeds, but continues to rotate adrift. To portray the abrupt change of speed due to the detachment from the mechanical arm, the camera suddenly ceases both translation and rotation movements. Now at the centre of the frame, from a fixed point of view, the character becomes smaller as she moves away onto the background, swallowed up by the void.

The next shot mirrors the previous one; the camera is placed opposite to the character, farther into space. Stone reappears at the centre of the image approaching the camera. The motion of the camera resumes as she passes in front of the lens; here the camera performs a third ‘gesture,’ turning to the left following the character’s movement. Immediately thereafter, the camera activates again as it attaches to the character to ‘follow’ her translation in space (while the character continues to rotate). Subsequently, the camera attaches to Stone’s rotation; once more we witness a ‘double attachment’ of the camera, following the character and rolling with her. The Earth’s surface flows back behind the character and is reflected on the visor of the helmet (not surprisingly spherical like a planet). Almost imperceptibly, the camera performs a fourth ‘gesture,’ as it slowly approaches the character’s face. Thanks to both the double attachment and the slow approach to Stone’s face, the film gives perceptual salience to the character’s tension and stress, evident in her facial expressions and intense breathing. The ‘listening point’ is placed inside the helmet and gives acoustic salience to difficult breathing; this is underlined both visually by the continuous steaming up of the visor, and verbally as Stone gasps “I can’t breathe…” As the camera focuses on her face, breathing stops; Stone is in apnoea, with her eyes crossed, aware of her possible imminent death (see Figure 1).

While the slow approaching movement continues, we witness another crucial move: the point of view passes through the transparent visor and penetrates inside the helmet. The exact moment of penetration is depicted acoustically thought a change in soundscape, from an external environment to an internal environment (similar to the effect produced by pressure change after immersion in water). The visual threshold when crossing the visor, however, is trespassed without any interruption, without any material break. Now inside the helmet, the camera’s point of view turns and merges with the character’s gaze, the direction in which the character is looking. For a few seconds, the viewer’s point of view aligns with Stone’s optical perception: the viewer can see data and indicators on the visor (keenly displaying the level of oxygen
supply falling below 10%). Stone has found a point of orientation and finally responds “I see . . .” to the pressing demands of Kovalsky to provide a visual reference that might be useful for localization. At this point, the camera takes the reverse path: it exits the optical alignment; it shows the profile of the character, leaves the helmet (with the relative sonic change), and moves slowly away. Stone tries to communicate her condition to Houston, albeit without response. The sequence ends with a final ‘detachment’ of the camera from the character’s movement alignment: a static shot depicting Stone spinning toward the void.

2.4. Adrift
To recount the preceding analysis, the framework of the filmic involvement is imprinted on a general condition of disembodiment, that is, it triggers in the viewer a sense of detachment and despair equal to that experienced by the character. The continuous capsizing, breathlessness, fogging of vision, etc., intensify the character’s psychophysical experience while evoking a similar experience in the viewer; as a result, the viewer feels like an astronaut immersed in the sidereal darkness of the cinema, at least temporarily. In non-gravitational fictional environments the relation between what movements are represented and how movements are represented acquires strategic importance.

My analysis of the Gravity sequence reveals four types of camera movement related the character’s movement in space: 1) linear translation (such as tracking or backward in the depth of the space); 2) rotation round the character’s body centre; 3) rotation with respect to a point (turning); and 4) slow approach to and departure from the character. These four moves are combined strategically. According to Vivian Sobchack (Address, Carnal, “Toward”), the ‘film-body’ adopts anthropomorphic postures and movements, similar (though not ontologically related) to those of the human body, thus establishing both as a means of expression and perception. The assumption of such postures and movements can be described as the filmic embodiment of the character’s motor and emotional tension.

The transition from mere representation of the character’s movement to its embodiment via camera movement is particularly important. Even more so, the embodied motion is not a linear translation, but a recursive rotation and, therefore, a cause for disorientation and disturbance of perception – a disembodiment. When the camera ‘attaches’ to the rotational motion, there is a re-embodiment of perception. In performing this ‘attachment,’ the film adopts a ‘gravitational aesthetic’ in a non-gravitational fictional environment, with
the effect of ‘fixing’ the movement and therefore reducing the sense of disorientation and disequilibrium.

Paradoxically, attachment implies ‘hiding’ the character’s movements. However, it is precisely because of such obliteration that the film engages the viewer at both the motor and the emotional level. Once ‘fixed,’ with Stone’s face at the centre of the frame, the viewer’s attention focuses on the character’s expressions and her psychophysical anxiety. The more the camera emulates the character’s movements, the more an emotional involvement replaces a motor alignment.

When the viewer relates closely to the character’s emotion, a series of ‘perceptual disturbance’ factors emerge, producing an affective disembodied intensification. As we have seen, the hostile conditions of the external environment and the consequent need to wear a space suit influence the mode of representation of emotions. The astronaut’s head, and therefore her face, is confined within the helmet and is framed in the visor, which acts as a second screen. Inside the helmet, breathing intensifies to express anxiety and fear. These emotions acquire a pivotal role thanks to their acoustic salience.

A new re-embodiment balances the respiratory intensification. This is achieved through a slow (and therefore almost unnoticed) approach to the character’s face, until the camera penetrates the helmet without noticing the obstacle of the visor – the last material barrier to the empathic conjunction between the viewer and character. The approach and penetration correspond to an embodiment process, culminating in optical-cognitive alignment: the point-of-view shot. Even in this case, the process of subjectification, through which re-embodiment of perception is maximally achieved, paradoxically results in the ‘concealment’ of the character’s face, which is the surface for communicating her emotions. However, at the end, the camera movement re-objectifies the point of view.

In both cases, the sense of motor and emotional stress experienced by both the character and the viewer is subject to a complex process of re-embodiment that, paradoxically, when realizing its alignment, also produces annulment. Re-embodiment creates homeostasis, recovering the disrupted balance. On the one hand, we bodily experience the ‘detachment’ of the astronaut and her drift in space as imbalance, loss, and suspension; on the other hand, we experience the ‘attachment’ of the film-body to the character’s postures and movements, offered by the film in order to balance dizziness, to ‘ground’ suspension, to restore graspability and comprehensibility.
2.5. Meaning of emptiness

My analysis of *Gravity* untangles the multiple meanings of *character embodiment* within film. First, in terms of mere representation, space-exploration films propose a *literal* embodiment, that is, a filmic integration of the character’s body and its physiological functions into material ‘cases’ such as the spacecraft, the space suit and the helmet. These pressurized and oxygen-supplied containers can be conceived as the *media* of experience, as they mark a *distance*, and at the same time allow the character to act within a hostile environment.

At a more abstract level, well described by phenomenological film theories, the dynamics of *disembodiment* and *re-embodiment* reflect a process of strategic compensation of dizziness and suspense through the adoption of a bodily-based formal articulation: the viewer adopts the film’s ‘attitudes,’ ‘movements,’ and ‘reactions,’ reflecting and *embodying* them, even when this entails a peculiar corporeality, not ontologically comparable yet ‘compatible’ to that of the viewer.

In addition to ‘anthropomorphic’ embodiment, the correspondence between the viewer’s corporeality and the film’s physicality indicates an almost organic form of *embodiment*. The analysis of *Gravity* relates the pleasure inherent in immersion (as the voluntary escape from the ordinary and secure perceptual parameters) and the rational need to re-emerge from immersion. As in any ‘classic’ narrative film – to which *Gravity* belongs – a *re-embodiment* is needed to balance the imbalance, to alleviate dizziness, to lighten the traumatic load, to recalibrate the excess of energy. This is akin to a homeostatic process biologically activated in the viewer: seeking a foothold if feeling down, closing the eyes to avoid seeing violence, tilting the head to align with angled faces, etc. The film *embodies* the same reactions through its own particular ‘body,’ that is, translating them into concrete formal proposals of *découpage* (which is negated in the long-take), point of view (between objectivity and subjectivity), ‘attached’ camera movements, etc.

Finally, *embodiment* can be intended symbolically and philosophically: the intensified involvement in space-exploration films explicitly or implicitly refers to an incumbent and essential danger: the *drift* into abyss with no chance of return or rescue. In *Gravity*, physical danger and existential drift are mutually embodied. Like most of the films set in space, *Gravity* is about emptiness in its literal and metaphorical meaning: it reflects the very nature of space, the precarious balance between the infinite and indefinite, the inconceivable
and problematic spatiality, and the limits of human possibilities. In *Gravity*, Cuarón successfully created a meaningful relationship at all levels of *embodiment*, relating the feeling of emptiness with the profound meaning of void.
NOTES

FILM AS AN EXEMPLAR OF BODILY MEANING-MAKING

1 For a good overview of these studies see Davis et al.

2 Lakoff and Johnson originally speak of ‘levels’ instead of ‘dimensions’. However, because the word ‘level’ might assume a hierarchical order, a positioning of one level above the other, we prefer to use the more neutral word ‘dimension’ instead.

3 Following Barsalou and Wiemer-Hastings we will define abstract concepts as “entities that are neither physical nor spatially constrained” (129).

4 In Conceptual Metaphor Theory it is common to use small capital letters to indicate that these particular wordings are not a matter of language, but of concepts, belonging to the realm of human thought. These concepts underlie the very nature of our daily metaphorical expressions (linguistic or otherwise).

5 As the author stresses, the order of both stages (first, body and second, culture) is at this point still a proposal. Future experimental research will have to address to what extent this order is empirically legitimate (“The Relationship” 323).

6 We thank Ibarretxe-Antuñano for giving us permission to use this image.

7 As we shall demonstrate in our own contribution about time metaphors in film, evidence from various films seem to suggest a spatial model of time, very similar to the one reported in the Aymara language, in which the past appears to be in front of the character or Ego on-screen.

8 Although the discipline of cognitive science began to acquire an institutional identity in the 1970s, as the term was first coined by Christopher Longuet-Higgins, it roots can be traced back to the 1940s and 1950s, to Gestalt psychology and the work of such scholars as Jean Piaget and Frederick Bartlett, among others. For a good historical overview see Bechtel and Herschbach.

9 For a good overview of some of the current views and issues within cognitive media theory see recent volumes such as The Routledge Companion to Philosophy and Film (Livingston and Plantinga), Psychocinematics: Exploring Cognition at the Movies (Shimamura), and Cognitive Media Theory (Nannicelli and Taberham).

10 Within the phenomenological dimension one should further distinguish between those film studies that are primarily inspired by the embodied phenomenology of Merleau-Ponty, and those studies that are centred on the Henri Bergson-inspired work of Gilles Deleuze. Although the work of the latter is usually considered as a phenomenological study of cinema in its emphasis on the felt and sensuous qualities of film, Deleuze himself rejected this characterization for the reason that phenomenology, in contrast to cinema, is based on “natural perception” and the “anchoring of the subject” (Cinema 1 57) (for a discussion see also Sobchack The Address 30-31).

FILM NARRATIVE AND EMBODIED COGNITION: THE IMPACT OF IMAGE SCHEMAS ON NARRATIVE FORM

1 In its relation to neuroscience, embodied cognitive theory operates at the level of abstract generalisation without the need for a neural mapping of the brain’s hardware. Still, the theory’s claims about psychological processes, stemming from cognitive psychology’s empirical investigations, certainly outdo armchair speculations.

2 Being consistent with Johnson’s guideline (The Body 23), I use the terms schema, embodied schema, image schema, and kinesthetic image schema interchangeably.
3 See Bordwell’s skepticism about the encompassing precision of identifying only 7 plots (Booker), and about the usefulness of discriminating as many as 36 ‘basic’ structures (Poli).

4 The same canonical neuron that fires when we see an object is the one that would fire (and activate our motor system) when we actually grasp that object. The same mirror neuron that fires when we see (or hear) somebody is doing (or feeling) something is the one that would fire (and activate our own motor system) when we actually perform the same action ourselves.

5 It is not easy to define the pleasure one feels while encountering pictorial, or, for that matter also, textually represented symmetry. From an embodied cognitive angle, symmetry and balance are pleasing to the eye or the mind as they imitate the symmetry and balance of the perceiver’s physiological makeup (which is projected to the visual or textual information).

6 These latter, higher order schemas are literary and cinematic equivalents of real-world segmentations’ habitual scenarios, described by mental models (Johnson-Laird) or situation models (Dijk and Kintsch).

7 As for how this cognitively impenetrable bodily resonance works through our Mirror Mechanism, that is best left to neuroscientific explanations and evidences, and even a brief case study exemplifying the theory’s applicability to narrative analysis – see Rizzolatti et al., Gallese (“The Manifold”), Rizzolatti and Sinigaglia, and Wojciechowski and Gallesse, respectively.

8 Through their cognitive development, children acquire their first narrative schemas from about the age of seven (Branigan Narrative 18-19).

9 Although it seems that the part-whole schema functions as a prerequisite for apprehending a hierarchic centre-periphery structure, their primary gestalts appear on the same category-level both in Lakoff’s and in Johnson’s standard inventory. The same applies to the link schema, which is also part of the core set in Lakoff and Johnson’s list, even though it is clear that a collection of parts can only constitute a whole if the parts are somehow linked with each other in advance.

10 About the degrees of narrativity, from non-narrative to minimally narrative and to fully narrative, see Monika Fludernik’s sub-chapter (243-248).

11 Taking the same visual approach in their study on virtual reality, Alison McMahan and Buckland contemplate upon our changing reliance on the container schema. When it comes to new media’s immersive 3D experiences, they claim that “VR environments (…) eliminate one level of container projection demanded by the viewer of the film.”

12 For a detailed overview of extended and embedded cognitive theories see Shapiro (Embodied 193-197).

13 Bordwell sees narrative complexification (in forking-path stories) as a ‘cognitively manageable,’ ‘pretty limited affair (“Film Futures” 90, 89). In their reactions Edward Branigan (“Nearly True”) and Kay Young (“That Fabric of Times”) both argue that Bordwell has this mostly right (hence the title of Branigan’s article, “Nearly True”), however his examples are restricted to classical Hollywood narratives and thus neglecting “other types of plotting not dependent on the ‘river of time’ metaphor” (Branigan “Nearly True” 107).

14 Naturally, Grodal does not mean that the experience of art cinema is fully detached from embodied cognition. Although he talks about ‘disembodiedness’ (Embodied 208-211), what he describes is the detachment of our comprehension from an actual and concrete bodily immersion (see how mainstream narrative films offer ‘concrete embodiment’ [208]), where the experience finds outlets in more abstract, somewhat ‘disembodied’ meaning making strategies (see how art cinema gives rise to feelings of ‘deep significance’ [149-150]).

15 See Johnson’s argument for the flexibility of image schemas (The Body 30).
EMBODIED VISUAL MEANING IN FILM

1 For a detailed discussion and critique of the conceptual/propositional view of meaning see Johnson (The Body, The Meaning).

2 For this reason the linguistic fallacy has also been related to anti-intentionalism, i.e., the view according to which the artist’s actual intention is irrelevant to the interpretations of artworks (e.g., Wimsatt and Beardsley “The Intentional”).

3 In this way one might argue that CMT is closely related to other theories of meaning that are primarily psychological rather than linguistic or semiotic. This recalls, for example, Paul Grice’s inferential model of communication, John Searle’s theory of speech acts or, more recently, Wilson and Sperber’s relevance theory. In the same derivative sense, Searle, for example, speaks of the distinction between ‘sentence meaning’ or ‘word meaning,’ on the one hand, and ‘speaker meaning’ or ‘utterance meaning,’ on the other (140). For Searle utterance meaning is a form of derived intentionality, in that it is defined by the mental content of the speaker, namely, his original intentions. When a speaker performs a speech act, he inflicts meaning by transferring the original or intrinsic intentionality of his or her thoughts (the conceptual) to the sounds emanating from his or her mouth or the marks made on paper (the form of expression). It differs from sentence meaning or word meaning in that it is related to the speaker’s mental stock, whereas the meaning of a sentence is entirely determined by linguistic and literary conventions. If uttered meaningfully, Searle writes, those sounds and marks “have not just conventional linguistic meaning but intended speaker meaning as well” (141). For an application of these insights to art see also Carroll (“Art Interpretation”).

4 Arnheim was obviously influenced by Kant’s Critique of Pure Reason (1781/1787).

5 For a discussion of the containment schema in other Westerns of John Ford see Coëgnarts and Kravanja (“On the Embodiment”).

FILM MUSIC AS EMBODIMENT

1 In describing the music, I avoid delving into complex music-theoretical explanations. The reader might benefit from knowledge of musical notation, yet this is not indispensable to an understanding of the annotated scores. These scores, however, are by no means intended to replace experiencing the music in the context of the film; I strongly encourage the reader to consult the various films. Timings for the scenes under discussion are supplied after the title of the film. These timings are not time-code based; they provide the hour, minutes, and seconds, as read by a DVD player. For example “0:03:35 - 1:20:20” should be read: “the scene starts at 0 hour, 3 minutes, and 35 seconds, and ends at 1 hour, 20 minutes, and 20 seconds.”

2 The ’abstract’ nature of music has been frequently discussed as stemming from: 1) the temporal and almost intangible nature of sound, which makes the perception of music an ephemeral phenomenon, and 2) the lack of specificity of representational and propositional content in music (see e.g., Kivy; Pratt; Walton).

3 Saslaw investigates various mental structures (or schemas) in the context of musical analysis, in particular when applying analytical methodologies put forth by Hugo Riemann.

4 Johnson (The Body) uses the terms ‘schema,’ ‘embodied schema,’ and ‘image schema’ interchangeably. His notion of schema has been expanded to include ‘expectation schemas’ (Cox and Huron).

5 Kövecses account for unidirectionality in metaphors stems from the concrete/abstract duality: “our experiences with the physical world serve as natural and logical foundations for the comprehension of more abstract domains. This explains why in most cases of everyday metaphors the source and target are not reversible” (A Practical Introduction 6). A few scholars, however, have challenged the notion of unidirectionality in the conceptual metaphor
binary structure. Ortony, for instance, addresses the subject of unidirectionality based on the recognition of the features projected from source to target. He claims that, in general, these features are highly salient for the source domain but not for the target. In the metaphor “This man is a monkey,” the salient characteristics of “monkey” (noisy, physically flexible, or other) are projected onto “man.” Reversing the order of source and target (as “This monkey is a man”) would produce different and arguably less clearly delineated projections.

Most scholars address one-dimensional abstract structures via the verticality or path schemas. Instead, I prefer the more abstract linearity schema, which does not imply physical orientation (as in verticality) or goal-directed motion (as in path). A possible argument for the widespread use of verticality is that “locating objects along vertical axis of the body is easiest because of the body’s perceived asymmetry with respect to the ground” (Barsalou “Grounded” 625). For a discussion about one-dimensional schemas please see Chattah (“Semiotics”).

The cyclic goal-directed motions mentioned here are broadly defined by their characteristic patterns of repetition. No taxonomy of movement involving complex motions of the whole body, however, seems to be available; naturally, any objective and formalized categorization of whole-body motion should consider (and possibly disregard) a range of variability in human motion.

Sherrington’s notion of ‘proprioception’ as sensory information provided by internal organs is addressed only tangentially in this chapter. For further insights on proprioception and music please see Peñalba Acitores.

Similarity correlations between conceptual domains are expressed in the form of a conceptual metaphor ‘A IS B’ as established by Lakoff and Johnson (Metaphors).

Justlin (“Perceived”) identified tempo as the most significant parameter in a modulating effect, triggering a wide range of emotional responses. For an in-depth exploration on the psychophysiological responses to musical tempo see Van der Zwaag, Westerink, and Broek.

In the Mandarin version of the film, the character performed by Ziyi Zhang is named Jen Yu.

Empirical studies by Husain, Thomson, and Schellenberg show that exposure to fast tempi result in increased arousal and tension. See also Van der Zwaag, Westerink, and Broek.

The reader might have encountered three words that seem equivalent: pitch, note, and tone. Although these words are often used interchangeably, pitch indicates the frequency of a sound, note is the conventionalized name for a particular pitch frequency (for instance, middle ‘C’ is 261.6 Hz), and tone addresses the timbre or ‘color’ of a sound.

Zbikowski observes that this conceptual metaphor varies among cultures. For instance, pitch relationships are relationships of physical size is used in Java and Bali, while pitch relationships are age relationships is used in Suya of the Amazon. This further emphasizes the notion that conceptual metaphors rely on abstract structures (in these cases the linearity schema).


Apart from glissandi, the chromatic scale provides the most continuous rendition in the pitch domain, as it includes all (twelve) pitch classes in the Western system of tuning; pitches repeat in different registers by way of multiples of their frequency. Alternative tuning systems (e.g., the Middle Eastern gadwall, or some traditional Indian systems) allow for microtonal pitch inflections.


Johnson and Larson explore the notion of motion in music as reflected in the lyrics George Harrison’s song “Something in the Way She Moves.” From a psycho-perceptual focus, Gjerdingen gives an account of motion in music with an analogy to the ‘phi effect’ in vision:
a succession of musical events (successive pitches for instance) when placed at appropriate
distance of each other (both in terms of frequency and temporality) will trigger a sense of
movement.

19 Employing the CAM model, Lipscomb found that perceived congruence is higher when
accent structures between sounds and visual images synchronize.

20 Bolivar, Cohen, and Fentress attempt to apply the CAM model to observe semantic and
formal (audiovisual) congruency.

21 Studies on Heart Rate Variability (HRV) shows that the heart-beat follows more constant pat-
tterns during tensed states, hence resulting in low HRV. Van der Zwaag, Westerink, and Brook
explored the influence of music in HRV, finding that “HRV was higher during slow tempo
music than during fast tempo music” (261). In a related study on brain stem reflex (which
controls changes in pulse, respiration, heart rate, skin conductance, motor patterns, etc.) Juslin
and Västfjäll explored the processes whereby emotions are induced by music. See also Levitin.
By extending these results to film music, I speculate that music during a film may induce emo-
tions through physiological mechanisms including heart-beat, respiration, skin conductance,
blood pressure, motor patterns, and even brain waves or neurochemical levels.

22 Note that when establishing semantic correlations, the music appears as the concrete domain
within the A IS B binary structure. This shift, from music acting as ‘target’ domain to music
acting as ‘source’ domain, defines the boundary of the Mickey Mousing technique.

23 Attempts to quantify degrees of dissonance date back to Pythagoras, who observed frequency
ratios in strings of various lengths.

24 Syntagmatic analysis attends to the temporal organization and placement of semiotic units
within a structure; paradigmatic analysis, on the other hand, attends to relations of a semiot-
ic unit to potential replacing units not present in the structure.

25 The major and minor scales have been the primary archetypes of Western music since the
seventeenth century. Many film composers, however, avoid the ‘happy’ or ‘sad’ coloring
typical of the major and minor scales by employing alternative pitch configurations, includ-
ing the Greek modes. These configurations expand the composer’s tonal-color palette while
providing new means for music-narrative interaction.

26 Qualifiers drawn from Cooke and Huron.

27 Qualia drawn from Huron (145).

28 Final cadences mark the ending point of musical phrases, and generally exhibit a descending
melodic contour (Huron). In fact, the term ‘cadence’ derives etymologically from the Italian
cadenza, which means ‘to fall’ or ‘declination.’

29 Other pitches (the mediant, for instance) provide a relatively high degree of closure.

30 Thompson, Russo, and Sinclair conducted three experiments to examine the influence of
musical underscoring on the judgment of closure in film. In order to provide a general
understanding of the concept of closure in music he draws on general music theoretical
concepts and on the theories of expectation by Leonard Meyer.

31 The music features a plagal cadence, commonly referred to as the ‘Amen’ cadence, outlining
a harmonic movement from subdominant to tonic. It is not coincidental that the film’s
opening musical gesture and its concluding cadence are in the same key.

32 While a linearity schema is defined by locations along a one-dimensional structure, a con-
tainer schema is defined by content and boundaries. Lakoff and Johnson regards our body
as the primary ‘container,’ as we are “bounded and set off from the rest of the world by the
surface of our skins (…) We project our own in-out orientation onto other physical objects
that are bounded by surfaces” (Metaphors 29).
The notion of homorhythmic denotes a single rhythm for all melodic lines.

Thomas Newman’s musical language brings to mind Aaron Copland’s open voicings featuring a profusion of fourths, fifths, and ninths. Although the ‘A Dorian’ scale is most prominent, Newman’s use of chromaticism results in tonal ambiguity in regards with the mode at a precise moment in the piece.

Hayward defines this tradition as “expressing futurist/alien themes through use of dissonance and/or electronic sounds” (24).

Donizetti intended this aria to be accompanied with a glass harmonica; instead the soundtrack features a flute. The eerie sound of a glass harmonica would have worked against the desire to ground his aria in human, rather than alien sonic environment.

As Huron notes, most melodies exhibit stereotypic patterns, the most common being the arch shape. Over time and with frequent exposure, listeners form expectations that reflect such patterns.

Sessions addresses musical phrases figuratively as performed “in a single breath” thus pointing to the vocal origin of musical phrasing.

The wordless vocals create associations with the sound of a Theremin. The use of a Theremin (and more broadly, of electronically generated timbres) has permeated in sci-fi films as a convention to represent alien beings since the 1950’s. In her survey of soundtracks to sci-fi films, Schmidt notes “there is some suggestion that our brains physically interpret electronic sounds as in some way profoundly artificial in relation to the sounds produced by other instruments (…) Thus, no matter how pleasing it may be to the ear, the electronic may always signify both itself and an anxiety about authenticity, and might have always been pre-destined to be alien” (36).

De Souza draws on Gibson’s notion of affordance to investigate the impact of instrumental interfaces in music production.

Research has shown that individuals with restricted mobility (paraplegics) experience difficulty in rhythm production in comparison with non-paraplegics (Huron).

Scholars have noted that sound is a direct result of objects moving; hence it can be argued that any sound (musical or otherwise) denotes a moving object. Cox maintains that most musical sounds are evidence of human behavior (“Metaphoric Logic”).

In outlining the associations triggered in instrumental music by Beethoven, for instance, Hatten asserts that styles “are themselves defined by certain structural oppositions” and with “clear associations with levels of society (…) A composer could exploit high, middle, or low styles the way a speaker exploits what sociolinguists call ‘social register’ in language” (77).

In this case the 5/4 meter is arranged in ten subdivisions organized as 3+3+2+2.

Cox is hesitant about extending the finding of Mirror Neurons in Macaques to the human brain; he instead proposes the ‘Mimetic Hypothesis,’ grounded on metaphorical and embodied representation (“Embodying Music”).

Drawing on Gallese’s notion of Mirror Neuron System, Pulvermüller seeks to obtain empirical evidence of neuronal discharge triggered by hearing (rather than seeing): “hearing a word seems to be associated with activation of its articulatory motor program, and understanding an action word seems to lead to the immediate and automatic thought of the action to which it refers” (1).

Sachs speculates that particular contours derive from animal instinctive howls or wails; he identifies examples in Western classical music as well as Russian, Australian aboriginal, and Lakota (Sioux) music.

Kubrick is known for using pre-composed classical music in his films. See for instance his use of Penderecki and Bartok (in The Shining) or Strauss and Khachaturian (in 2001).

Van der Zwaag, Westerink, and Broek survey the effect of percussiveness in music percep-
tion and further speculate “the amount of percussiveness in music indicates the power of the music’s impact” (253). Their empirical studies confirm this hypothesis by showing that skin conductance level (an indicator of emotion) “increases with higher percussiveness, as skin conductance is a direct reflection of the sympathetic nervous system, which is positively related to energetic as well as tensed arousal” (262).

50 A leitmotif is a short recurring musical idea associated with a character, place, or object, established by the concurrent and consistent appearance of a particular melodic idea and its counterpart in the film’s story-world. Film music archetypes exist outside of a single film; these develop via frequent exposure to music, becoming cultural units the listener identifies via the music’s stylistic characteristics. Arguably, accompaniment to silent film sought to trigger phenomenological responses; yet a close inspection of (at the time available) compilations for pianists, organists, and conductors (e.g., Ernő Rapée’s Encyclopedia of Music for Pictures of 1925) illustrate that pieces were arranged according to categories akin to archetypes, such as ‘Bridal Scenes,’ ‘Oriental,’ ‘Religious Music,’ etc. As a result, the purpose of performing these pieces during a silent film was to set locale, set time period, as genre identifiers, and as indicators of the ethnicity or socio-cultural background of characters. Leitmotifs and archetypes may rely on analogy or resemblance; but it is largely agreed that leitmotifs and archetypes draw on arbitrarily established relations, and thus become conventional within culturally defined repertoires. For an in-depth investigation on the relationships between the music’s connotations and a film’s narrative, please see Chattah (“Conceptual”).

THE FLOATING WORLD: FILM NARRATIVE AND VIEWER DIAKRISIS

1 See Plato, Republic III, and Aristotle, Poetics III, discussed below. Bordwell, Narration in the Fiction Film (16).

2 Although the term diakrisis is not a concept in classical poetics, I introduce the term in this chapter to name a set of phenomena that take place in the mind of the spectator, as well as the creators of a film (director, actors, editors, etc.).

3 I use the term ‘superstructure’ in a non-marxian sense here.

4 In literary studies, the ‘fallacy’ of relying on the author’s stated or inferred intentions in order to determine what a works means was a credo for more than half a century, starting with T.S. Eliot’s 1921 essay “Tradition and the Individual Talent” and articulated most fully in Wimsatt and Beardsley’s article “The Intentional Fallacy,” and republished in expanded form in The Verbal Icon: Studies in the Meaning of Poetry (3-18). This insistence on bracketing out authorial intent from the finished work seems not to have been a strong principle within film studies.

5 Seymour Chatman explains: “The difference between narration proper, the recounting of an event (…), and enactment, its unmediated presentation (…), corresponds to the classical distinction between diegesis and mimesis (in Plato’s sense of the word), or, in modern terms, between telling and showing. Dialogue, of course, is the preeminent enactment” (32).

6 Ibid., 9-10. Gaut goes to some lengths to dismantle the notion that the viewer can share the position of this implied filmic narrator. The viewer doesn’t get to tell the story, and thus cannot be the narrator. We may pretend that we are having the same perceptual experiences that the implied narrator/observer does, but that illusion is not really sustainable (Gaut 203-206).

7 For an excellent recap of these debates see Gaut (197-243).

8 Bordwell notes that diegetic theories of narrative came into their own during the era of French structuralism and poststructuralism (Narration 17-18).

9 Paradoxically, visual elements such as film edits are often considered through a diegetic framework, as well, because they become a vehicle of narration that is ‘language-like.’
10 Still more confusingly, diegesis is applied by some to non-fictional storyworlds, as, for example, in documentary films. However, it is more typically applied to fiction.

11 Jason Mittell explains the distinction between diegetic and non-diegetic elements of narrative with examples from *The Wizard of Oz*: “The diegesis refers to the storyworld which the characters experience, whether we witness it or not—even though we do not see Dorothy’s house land on the Witch of the East, it is a diegetic element of the film’s narrative, later recounted by the Witch of the North. (...) By contrast, non-diegetic elements are used to tell the story, but do not actually appear within the film’s internal storyworld. Typically, films employ non-diegetic techniques such as camera movements, edits, and soundtrack music to represent aspects of the storyworld and guide our reactions to onscreen events” (“Film” 160). There is some slippage in the term “diegetic,” defined earlier in this chapter as the “telling” of a narrative. In Mittell’s description, diegesis occurs *within* the storyworld, while the non-diegetic elements of narrative remain outside of it, yet still help tell the story.

12 Carroll’s concept of the erotetic assumes that films actually have a narrator, which, as we have seen, is a complicated assumption, especially in the case of implied narrators.

13 Bordwell calls these templates *schemata*. Schemata are broad categories of information we carry inside our head that we use to make rapid judgments about specific information presented in a film (*Narration* 31-39 et passim).

14 Dehaene and his colleagues theorize consciousness as a ‘global neuronal workspace.’ “We propose that consciousness is global information broadcasting within the cortex; it arises from a neuronal network whose raison d’être is the massive sharing of pertinent information throughout the brain” (13).

15 On the phenomenon of embodied simulation, our innate capacity to understand the actions, basic motor intentions, feelings, and emotions of others, and thereby to ground our identification with and connectedness to narrated characters, see Wojciechowski and Gallese.

16 Viewer X is loosely based on my own recent screening of *Titanic* as I was writing this article. It is a highly approximate reconstruction of my thoughts as I was watching, which I wrote down a day later. Viewer Y is loosely based on the thoughts of my partner Eric Chapelle, a composer and connoisseur of film scores, who generously contributed his own reconstructed internal narrative in response to my invitation.

17 Imaginary stream-of-consciousness narrative was pioneered by James Joyce and Virginia Woolf, and many others in the meantime.

18 Dehaene notes that subjective responses were looked down on by scientists, particularly in the wake of mid-twentieth century behaviorism. “The correct perspective,” Dehaene argues, “is to think of subjective reports as raw data” (12). If subjective reports are one half of the equation, experimental data is the other, he asserts.

19 See also the previous note, which discussed Wimsatt and Beardsley’s companion essay “The Intentional Fallacy.”

20 For a summary of some of these experiments, see Chapters 1 and 2 of Dehaene’s book *Consciousness and the Brain* (17-88). Scientists can track the progress of visual information in the brain, determining how far it must progress in order to register consciously. Interestingly, such information may be processed and even acted upon, whether or not it reaches an individual’s conscious awareness.

21 Interestingly, Donald’s example of intermediate-term memory in action is a conversation between eight people about a film that they have recently viewed (Donald 46-91).

22 The ‘movie’ they used in their experiment was a 27-minute episode of *Curb Your Enthusiasm* (Season 1, Chapter 7).
MODES OF ACTION AT THE MOVIES, OR RE-THINKING
2 See at least Cutting, Brunick, and Candan; Smith T.; Smith, Levin, and Cutting.
3 I borrow the term from David Bordwell (Poetics 46).
4 See, e.g., Ihde (iii).
5 On the relationship between the cinematic illusion and the viewer’s body see Voss.
6 I think of two American books like The Photoplay (1916) by Hugo Münsterberg and The Art of Photoplay Making (1918) by Victor Oscar Freeburg.
7 See, e.g., Grodal (Embodied).
8 See at least Chateau; Barker; Stadler.
9 Among others, Bochet et al.; Furman et al.; Iwase et al.; Nishimoto et al.; Rothstein et al.
10 For a recent publication, which allows one better to grasp Merleau-Ponty’s ideas on cinema, see the 2011 edition of Merleau-Ponty’s 1953 Cours au Collège de France Le Monde sensible et le Monde de l’expression.
11 Beyond the already mentioned Sobchack and Barker, see also Marks and Rutherford.
12 See, e.g., Smith, Murray.
13 This is the approach of some analysis by the already mentioned Barker, and by D’Aloia (La Vertigine).
14 Bordwell put forward the idea that low-level, modular processes play a key role in eliciting suspense – the so-called ‘firewall hypothesis’ – and this would be one of the reasons why we experience the same feeling when we see a movie for the second or third time. He attributes such an effect to a kind of resonance in which mirror neurons would also play a role (Bordwell and Thompson Minding Movies 100).
15 Gallese et al.; Gallese, Keyser and Rizzolatti.
16 See Michotte van den Berck (“La Participation”); Wallon. See also the parts on cinema in Merleau-Ponty (Le Monde).
17 Canonical neurons – in the premotor and posterior parietal cortex – selectively activate both when the agent grasps an object and when he merely perceives it. For evidence on canonical neurons in monkeys see Murata et al. For evidence in humans see Grèzes et al.
18 On film metaphors and camera movements see also Coëgnarts and Kravanja (“The Visual”).
19 See also Heimann et al.; Gallese and Guerra (“The Feeling”).
20 For more details see references in previous note.
21 This is the proposal by MacDougall.
22 Daves’ “Observations on the Camera Acting as a Person” are mentioned and commented by Vivian Sobchack (“The Man” 72-74).
23 See at least Magliano and Zacks.

ART IN NOISE
1 Lawrence Shapiro describes embodied cognition as less a theory than a research programme unified by its commitment to “elevate the importance of the body in the explanation of various cognitive abilities” (“The Embodied” 340).
2 Embodied simulation theory has been recently applied to cinema by Gallese and Guerra, but their focus has been unimodally limited to visual imagery. Fahlenbrach, however, has written
extensively upon cinematic sound and affect from the perspective of embodied metaphor ("Feeling Sounds", “The Emotional Design”, “Aesthetics”) and, latterly, embodied simulation (“Embodied Spaces”, “Emotions”). In this chapter, my contribution to the research approach rests in locating a basis for embodied meaning in the sonic induction of affect described by the BRECVEMA framework.

3 But see the individual work of Brian Boyd, Joseph Carroll, and Jonathan Gottschall, for an overview of the recently emerged cognitive and evolutionary approaches to literary theory (see also their edited volume Evolution, Literature, and Film: A Reader).

4 My reference to theories of affect should not be confused with ‘affect theory’ currently in use within humanities discourse. My use of the term affect is not identical to its use by affect theorists such as Brian Massumi, Nigel Thrift, or William Connolly.

5 Thus far my professional career encompasses 30 years in sound design with the last decade also encompassing media education.

6 David Bordwell, in referring to “Grand Theory” as SLAB theory, an acronym formed from “Saussurean semiotics, Lacanian psychoanalysis, Althusserian Marxism, and Barthian textual theory” (“Historical”, 385), underscores its doctrine-based nature and limitations.

7 However, Gianluca Sergi (“In Defense”), Barbara Flueckiger, and Birger Langkjær are notable exceptions to this trend.

8 Listed here are some of In the Cut’s sound design personnel:
   Supervising sound editor: Andrew Plain
   Dialogue editor: Linda Murdoch
   Sound designer / SFX and atmospheres editor: Peter Miller
   SFX and atmospheres editor: Mark Ward
   Foley supervisor: Blair Slater
   Foley artist: Mario Vaccaro
   Sound re-recording mixer: Martin Oswin
   A more complete listing of the movie’s creative personnel may be found at the International Movie Database. See http://www.imdb.com/title/tt0199626/.

9 Walter Murch and Randy Thom, of course, have consistently presented their ideas about cinematic sound to a wider audience, yet they remain decidedly designers of sound rather than writers of theory. Rare examples of practitioner-theorists might include Michel Chion and Daniel Levitin. Chion is a composer as well as a noted author of film-sound theory, while Levitin is a music producer who turned to a systematic programme of research in the neuropsychology of music cognition.

10 As illustration, consider the role of audition in controlling visual attention in Timecode (Mike Figgis, 2000) where synchronous sound activates the screen sector to which the audience will (mostly) attend. Sound design is also strikingly used to steer visual attention through highly complex or rapidly changing visual displays such as in the genres of action-adventure or thriller. A good example of this is the T-Rex battle in King Kong (Peter Jackson, 2005) where sound guides visual attention through a highly dynamic series of threats and opportunities. However, this steering function also occurs in tranquil movies, such as in the harsh scraping of a boy’s shoes on a doormat in Mon Oncle (Jacques Tati, 1958, at approximately 00:18:30 (hh:mm:ss)), attracting our visual attention even though the boy is in deep background and a highly animated conversation is underway in foreground. See Noesselt et al. for a description of how “sound increases the saliency of visual events.”

11 Many examples of this aesthetic effect may be found in the works of David Lynch, particularly Mulholland Drive (2001), Lost Highway (1997) and Eraserhead (1977).
12 For reviews of the empirical literature on auditory imagery see Timothy Hubbard and the edited work *Auditory Imagery* (Reisberg).

13 For example, the spatial illusion of the *ventriloquist effect* (Bertelson; Bertelson and Aschersleben; Thurlow and Jack) whereby visual spatial location captures auditory location, and the speech illusion of the *McGurk effect* (McGurk and MacDonald) whereby vision modifies speech perception.

14 Mechanisms for multimodal interaction are many and varied, and limitations of this chapter do not permit a full cataloguing of their relevance for cinematic media. However, for a comprehensive review see the edited volumes *The Handbook of Multisensory Processes* (Calvert, Spence and Stein), and *The Neural Bases of Multisensory Processes* (Murray and Wallace).

15 In this regard, it is interesting to note Joseph Anderson’s prescient assessment of crossmodal confirmation as a fundamental mechanism for the creation of cinematic events (“Sound and Image”).

16 For a discussion of contemporary sound design and the interaction of the soundtrack’s three major components of dialogue, music and sound effects, see Altman, and Altman, Jones and Tatroe. For a comprehensive review of the sound of silent cinema see *The Sounds of Early Cinema* (Abel and Altman).

17 Van Wassenhove, Grant and Poeppel identify this temporal window as holding for audiovisual speech, but it may be assumed to extend to other ecologically valid audiovisual stimuli. See also Slutsky and Recanzone.

18 A dominant aesthetic within the virtual world of TRON is a form of digital ‘chunkiness’ in which its crystalline nature stands in contrast to the smoothness of the real world. This aesthetic grounds concepts of threat where characters literally risk disintegrating into blocks of digital debris. Such a digital aesthetic also underpins notions of racial and social identity. From an aesthetic perspective, it is worthwhile noting a parallel use of digital granularity within *The Matrix* where Neo’s voice similarly disintegrates at the point of his first passing from the Matrix into the Real World. In this instance, the disintegration of Neo’s voice is synonymous with the disintegration of his virtual self.

19 Parallel with the increasing significance of timbre in cinematic sound is Rebecca Leydon’s observation that contemporary music is “increasingly focused on timbre as a crucial semantic feature” (1), and argues an urgent need to explain its function.

20 To date, the most sophisticated soundfield technology is Dolby Laboratories’ Atmos, a format which supports the processing of 128 discrete audio channels distributed to up to 64 speaker feeds.

21 Tan goes on to say the “distal cause of entertainment activity is an unconscious need for training useful capabilities, whereas the proximal cause is enjoyment of the activity for its own sake” (“Entertainment” 28).

22 Gallese has written further upon Feeling of Body and ‘liberated’ embodied simulation in relation to narrative and psychoanalysis, noting “the bodily affective self is at the roots of the narrative self” (“Embodied Simulation Theory” 196).

23 The term *narrative design* is commonly encountered in the computer game industry where it stands in the stead of *screenwriter or author*. My use of the term here signals a desire to make commensurate the design processes of narrative and perceptual imagery. *Narrative immersion* is sometimes also referred to as *transportation* (Green and Donahue; Holland; Mar and Oatley; Sestir and Green; Tal-Or and Cohen).

24 Cinematic proto-narrative acts as a workspace where bottom-up and top-down processes interact. Hence, my notion that proto-narrative is an interface. However, there are limitations
to the capacity of top-down processes to act upon the primitive. For example, it is doubtful top-down processes have any influence over the primordial feelings or life-regulation processes controlled at the level of the brainstem. As to what is produced as a consequence of this interface, which grounds cognition in perception, I suggest Barsalou's concept of perceptual symbols ("Perceptual" 577).

25 For a discussion of the return of the cinema of attractions in post-classical cinema see the edited volume The Cinema of Attractions Reloaded (Strauven) and Ndalianis.

26 Parallel to Wojciechowski and Gallese is Patrick Colm Hogan's proposal for an affective narratology (Affective Narratology). Hogan considers the structure and purpose of stories as inseparable from our emotion systems ("A Passion" 65).

27 For a survey of emotion concepts and the trends these concepts indicate see Kleinginna and Kleinginna, and Russell and Lemay. For an overview of the abiding problems in defining the field of emotion study and producing satisfactory definitions of emotion concepts see Frijda ("Point of View"). For a history of the development of the scientific study of emotion see Gendron and Barrett.

28 For a current account of the working definitions of ‘emotion’ see Izard, and Gendron.

29 There is a dearth of research which specifically examines the relationship between environmental sound and affect. The current research programme of emoacoustics, a portmanteau of emotional acoustics and represented by the work of Asutay et al., Tajadura-Jíménez, Tajadura-Jíménez et al., Väljamäe and Tajadura-Jíménez, responds in part to this lack.

30 See Russell's virtual reality hypothesis ("Core Affect" 155-156) for further discussion of the role of core affect in art and entertainment.

31 In this regard, Bartsch and Hübner's observations echo Mark Johnson's theory of embodied meaning ("Embodied Meaning", The Meaning) which argues that even the highest levels of complexity found in human abstract thinking have their basis in the lowest levels of the biological.

32 For a discussion of the design strategy for voice see Macallan and Plain (253-255). Plain is the supervising sound editor of In the Cut.

33 The sound design process for the creation of sound effects (SFX) and atmospheres of In the Cut is somewhat unconventional. Ordinarily, a single individual (or small group) is responsible for either the SFX or atmospheres across the duration of a movie. In the case of In the Cut, Miller and I divided the movie according to scene location so that we were each individually responsible for both the SFX and atmospheres of specific environments. This allowed for an intimate evolution of each locale’s environmental soundscape through which we shaped an emotional landscape.

34 Edward Hall (Hall "Proxemic Behavior", Hidden) termed the study of a segmentation of human space as proxemics. These spatial zones exist pan-culturally, but are modulated by cultural rules. In this way, proxemics can be understood as both a biological-ecological understanding of inhabited space as well as providing basis for a study of social semiotics. The proxemics of In the Cut arises from the cinematic manipulation of peripersonal space.

35 For example, consider the sequences at approximately 00:11:10-00:14:05 (hh:mm:ss), 01:15:53-01:17:50, and 01:19:25-01:23:02, respectively.

36 Although opportunity does not permit examination of the impact of affect upon subjective temporality, several significant studies should be mentioned in passing, in particular (Bar-Haim et al.; Droit-Volet and Meck; Droit-Volet and Gil; Droit-Volet, Fayolle and Gil; Droit-Volet, et al; Noulhiane et al.; Schirmer; van Wassenhove et al.; Yamada and Kawabe).

37 Hovering in the background of this chapter, of course, is the irony in attempting to explain the embodied meaning of sound through the written word.
38 For recent examples of this kind of cross-fertilisation of artistic and scientific practice see Heimann et al.. See also Guerra (this volume) for a discussion of how cinematic visual movement may be explored for its ecological validity in the activation of the MNS and social cognition, and T.J. Smith, and Smith, Levin and Cutting for an exploration of audience reception of filmmakers’ intentions through the eye-tracking of actual movies. However, as with much theory in Film Studies, these examples reveal a focus upon the visual at the exclusion of the auditory, illustrating the need for yet more innovative experiments to capture the role of multimodality in cinematic experience.

THE CHARACTER’S BODY AND THE VIEWER: CINEMATIC EMPATHY AND EMBODIED SIMULATION IN THE FILM EXPERIENCE

1 Mental simulation developed within Philosophy of mind in the context of the Simulation-theories debate (Currie and Ravenscroft; Gallagher and Zahavi; Goldman; Gordon).

FILMS AND EMBODIED METAPHORS OF EMOTION

1 Conceptual metaphors are conventionally printed in small capitals, and metaphorical expressions in italics.

2 Gibbs (Embodiment 244) reminds us that the word emotion itself stems from the Latin movere.

3 The degree of redundancy may vary from one film to another and within the same film.

4 The following are some of the comments on the film included in http://www.imdb.com/title/tt0180093/reviews: “One of the most devastating and beautiful experiences I’ve had watching,” “Aronofsky knows how to tell a story in a way that is dazzling in its use of sound, editing, and cinematography,” “It is the essence of independent filmmaking, a daring, engrossing, artful film that stays with you long after you leave the theater,” “(...) this film went straight for the heart, ripped it out and kicked it around the floor for 90 minutes,” “A masterpiece of all the elements of what filmmaking is about, mixed together in some sick soufflé and thrown into your face, burning hot and scalding,” “It had a profound impact on me and I haven’t been able to stop thinking about it since I watched it on opening night.”

5 Available at http://tla.mpi.nl/tools/tla-tools/elan/.

6 See the director’s comments on the DVD.

EMBODIED CINEMATIC SUBJECTIVITY: METAPHORICAL AND METONYMICAL MODES OF CHARACTER PERCEPTION IN FILM

1 See also Sweetser and her claim that physical touching and manipulation are common semantic sources for English perception verbs (i.e. visually picking out a stimulus) (32).

2 See in this regard, also the notion of the modularity of mind, i.e., the question regarding the functional and compositional architecture of the mind (e.g., Fodor Modularity 10-11).

3 Note that it is not always necessary for the viewer to actually see the perceptual organ in order to identify the metonymical relationship. Top-down knowledge can help to aid in this identification. For instance, we know enough about the structure of human bodies to know that the eyes are attached to the head, so even if we only see, for example, the backside of a character’s head in the foreground of the frame with the object of his gaze in the background, we are able to infer the perceptual organ, and by extension the metonymy eyes stand for seeing.
4 For a discussion of the term ‘homospatiality’ in relation to visual metaphor see also Carroll (“A Note”), Forceville (“The Identification”) and Coëgnarts and Kravanja (“From Thought”).

5 A similar categorization of the perception is reception metaphor in film can be construed by reversing source and goal in Table 4.

6 For a detailed discussion of this scene, albeit without yet explicitly referring to the conceptual metaphor perceiving is touching, see also Coëgnarts and Kravanja (“Towards” 9-11).

7 A similar metaphorical application of this type can be discerned in the scene from Barry Lyndon when Lady Lyndon catches her husband cheating on her (for a discussion of this scene see also Coëgnarts and Kravanja “Towards” 8-9).

ON THE EMBODIMENT OF TEMPORAL MEANING IN CINEMA:
PERCEIVING TIME THROUGH THE CHARACTER’S EYES

1 In ‘sequential scanning’ the different configurations are viewed successively (as in watching a motion picture) (Langacker 145). It differs from what Langacker in his theory of Cognitive Grammar refers to as the process of ‘summary scanning’ where aspects of a scene are scanned simultaneously (as in looking at a photograph) (144-146). Where the former is connected to events that represent time as something dynamic, the latter is linked to static scenes that conceptualize time as a unified whole (see also Evans and Green 535).

2 One might counterargue that the absoluteness of this interpretation is somewhat tempered by the fact that the shot of the past (i.e., the object of her memory) does not represent a subjective shot of Deborah’s POV, but an objective shot of Deborah’s face and body. In other words, the viewer is not literally looking through her eyes as she remembers herself as an external entity. This, however, does not stand in contradiction with human evaluation of past experiences. As the cognitive neuroscientist Shimamura writes: “Our recollections are sometimes viewed as if we are seeing a different person. For example, sometimes we might recollect an episodic memory not from a first-person perspective in which we visualize the event in the same manner as we viewed it originally, but as seen from a third-person point of view, as if we are observing the scene from a distance” (Experiencing Art 137). Nevertheless, as our chapter will show, there exist other examples in cinema where the shot of the past coincides with the POV of the character that remembers.

3 For a similar discussion of Lone Star from the perspective of CMT see Ortiz (“Visual Manifestations” 12-13).

4 This analysis differs from our previous study (Coëgnarts and Kravanja “The Visual”) in which the flashback scene from The Passenger (Michelangelo Antonioni, 1975) was studied as an example of the time-moving metaphor on the grounds that the character is stationary. However, this account did not take into consideration the concept of perception, and the possibility that the perceiver’s sight can be expressed metaphorically by camera movement in which the camera brings the perceiver’s point of view in direct contact with the perceived object (i.e., the time).

5 Falsetto’s comprehensive analysis of the sequence was very useful for describing and structuring the different shot transitions (112-115).

6 The latter can be considered an example of what Edward Branigan, following Noël Burch, calls ‘proximate spatial articulations;’ that is, ‘the space revealed by shot A is near that of shot B – perhaps within the same room – but at no point does it overlap or coincide with the space of shot B” (“Formal” 54).

7 For a more elaborated discussion of the role of the containment schema in the conceptualization of binary oppositions in film see Coëgnarts and Kravanja (“On the Embodiment”).

8 For this reason one might argue that the third case is closely related to Grady’s notion of resem-
blance metaphor (“A Typology”). In contrast to the group of correlation-based metaphors, which involves a set of correspondences between a concrete source domain and an abstract target domain (e.g., *time is space, knowing is seeing*), resemblance metaphors are grounded in a single resemblance between target and source. In the expression “Achilles is a lion,” for example, one feature, namely the inner characteristic quality of courage, is mapped from the lion onto Achilles. One kind of resemblance metaphor that has received much scholarly attention is the image metaphor (Deignan; Gibbs and Bogdonovich; Lakoff “Image Metaphors”, “The Contemporary Theory”; Gleason; Lakoff and Turner). Here, the mapping of a single resemblance is based on a shared image structure rather than on a shared inner quality. For instance, in the often cited André Breton example of “My wife…whose waist is an hourglass,” one aspect of an hourglass, namely its shape and more specifically its narrow centre, is mapped onto the form of a woman. According to Lakoff and Turner image structure is characterized by both part-whole structure (e.g., the relation between a roof and a house) and attribute structure (e.g., colour, physical shape, intensity of light, etc.) (90).

Exemplary in this regard would be the pub scene from David Lean’s film *Ryan’s Daughter* (1970) in which Major Randolph Doryan’s (Christopher Jones) aural perception of Michael’s (John Mills) repetitious banging of his leg on the pub bench causes him to recall the dreadful memories of his time in the trenches during World War I.

**EMBODIED ETHICS AND CINEMA: MORAL ATTITUDES FACILITATED BY CHARACTER PERCEPTION**

1 For the sake of introducing and situating embodied ethics we are simplifying deontology somewhat here (see also Slingerland 306).

2 As we will point out ourselves in the analysis of our own examples later, assessing what is wrong or not often crucially entails that we contextualize what we are witnessing. This is especially the case when we are evaluating other people (whether real life or fictional) on the basis of a description of their perceptual acts. That is, in order to provide a proper account of the moral weight of the perception of a person or character, one often has to bring in additional a priori information, the kind of knowledge which is often fuelled by a priori cases of perception itself.

3 This broadening and non-dualistic conception of perception also recalls Rudolf Arnheim’s writings on visual thinking. As we have already seen earlier in this volume, perception, according to Arnheim, offers more than just the passive processing of the stimuli arriving at the sensory receptors. For Arnheim, the separate treatment of seeing and thinking is “absurd” because “in order to see we have to think, and we have nothing to think about if we are not seeing” (“A Plea” 492; see also *Visual Thinking*).

4 For a discussion of the importance of emotions in ethical matters see also Oakley.

5 Carl Plantinga claims something similar when he states: “The ability of narrative films to elicit sympathies, antipathies, allegiances, and other responses to fictional characters is a key element in their aesthetic success, and in their moral and ideological impact” (“I Followed” 34).

6 For a typology of various affective responses to fictional characters see Plantinga (“I Followed” 43).

7 For more on the evaluative nature of emotional responses in film see also Dadlez (“Seeing”) and Carroll (“Movies”).

8 Note the link with the moral perception view according to which perception (i.e., the lower level) always precedes moral judgement (the higher level) (see also Vetlesen 4).
The term ‘dramatic’ is used here in the literary sense of relating to drama or the study of drama.

It would be an interesting empirical problem to examine how much additional narrative information the viewer needs in order to make this kind of mapping from the perceptual level of the character onto the intentional/mental level of the character.

For a good summary of these studies, see Winter (152-153).

For a good discussion of both concepts see also Plantinga (“I Followed” 36).

The idea that thought is mirrored in the face goes back to Ancient Greece, and up to modern facial expression research. For a good historical overview of some of this literature see Scherer (141-144).

COGNITIVE SEMIOTICS REVISITED: REFRAMING THE FRAME

We need to be aware that cognitive science is itself undergoing theoretical reduction via neuroscience. See, for example, Bickle.

I wish to thank Edward Branigan for his feedback on an earlier version of this chapter.

Furthermore, it is important to note that image schemata are not literal images (for images are always of something specific). Instead, this term refers to mental structures, which are more abstract than an actual image. We begin with images, but abstract structures from them to form schemata.

For a more detailed analysis of Inland Empire from a formalist perspective, see Buckland (“The Acousmatic Voice”).

Werner Wolf defines metalepsis as “a fictional representation consisting of several distinct worlds and levels, among which unorthodox transgressions occur” (95).
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