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Résumé de l'article

Prenant pour base les théories évolutionnistes, développementales et neuropsychologiques, alliées à la théorie et à l'analyse filmiques, cet article examine le rôle joué par l'empathie dans les réactions émotionnelles que provoquent, chez le spectateur, le visionnement de films de fiction à « forte charge émotive ».

Empathy, Film, and the Brain

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From the 1920s onwards, film and media research as well as public debate have to a large extent focused on the possible harmful effects of audiovisual media in inviting immoral behavior among audiences, whereby the latter imitate the violent actions and sexual acts witnessed on screen. In contrast, the study of the role of film and other audiovisual media in promoting empathy and care has not been prominent.

A central aspect of filmic representations lies in the motivation for audience to create bonds with (fictive) others. When films are watched in theaters, a para-social bond between viewers and characters is established and experienced – as well as a social bond between viewers – with the background feeling of a shared experience. Central to the film experience – one that expands language-based storytelling with its added audiovisual dimensions – is the portrayal of the lives of other human beings in such a fashion that viewers are invited to share their cognition, emotions, goals, situations, and social environments.

Because films are produced to capture and sustain viewers' attention, they magnify all kinds of possible human behavior, virtues as well as vices. Violence is indeed prominent in certain types of film, and this appeals to some of human beings' most ancient emotional systems. The affective neuroscientist Jaak Panksepp (1998) has argued that humans and other mammals possess seven major affective sub-systems for respectively : aggression, fear, lust, seeking, care, panic/sadness, and playing. (The subsystem for 'seeking' is the motivating force behind searching for resources and similar goal-oriented activities, as when an animal searches for a possible meal or a detective follows clues and leads for a specific purpose).

The first four emotional systems have reptilian roots although the

seeking subsystem also evolved to support highly intellectual endeavors. The last three systems are mammalian in nature, reflecting that the emergence of mammals during evolutionary time involved evolutionary tinkering, radical reordering and the expansion of the emotional system.

Large segments of action films, crime fiction, adventure films, and war films conspicuously rely on such 'reptilian' emotions : most prominently, anger, desire, and fear. Anger and fear, as argued by Torben Grodal (2010), fuel a small number of fictive scenarios that provide the central emotional arousal in a wide variety of action-based films : hiding, tracking, trapping/being trapped, observing, fighting and fleeing.

In contrast, the mammalian additions are centrally focused on bonding and care. Whereas reproduction among reptiles is based on the innate capabilities of the individual egg to develop independently of maternal or paternal care, mammals primarily rely on maternal care (Churchland 2011; Fisher 2004). The classical children's animation film *Bambi* (David Hand 1942) is just one example among many that represents strong mammalian emotions – another more contemporary example is *Finding Nemo* (Andrew Stanton 2003; see Grodal 2009). *Bambi* uses animated animal forms to show how maternal care and the panic resulting from jeopardizing the parental bond may be portrayed in such a way as to directly and strongly appeal to children's need for care, attachment security, and emotional regulation from their caregivers – a motivation that is strongly 'scaffolded' by attachment representations as depicted in many films and other media (Kramer 2010; Kramer forthcoming). In *Bambi*, the strong feelings of panic and sadness that are elicited when Bambi loses its mother in the meadow exemplify how significant the emotional and social loss of parental love can be.

The push for sharing feelings with kith and kin became crucial for our ancestors some 220 million years ago when mammalian infants became dependent on intensive maternal care in order to thrive and survive (Lambert 2012). According to neuroscience philosopher Patricia Churchland (2011), it was during the paleo-mammalian age that reproductive and self-preservative motivations were extended beyond the reptilian 'me'-centered strategies aimed at exclusively satisfying the needs of the 'self' and began including strategies taking into consideration the needs of others that are like the 'self'. In particular, offsprings and subsequently mates, as well as relatives and other group members, were incorporated as motivationally meaningful (Churchland 2011; Meltzoff & Decety 2003).

The central circuitries in mammalian bonding that regulate social behavior are induced by the mammalian neurotransmitters oxytocin and vasopressin (neurotransmitters are the body's and the brain's chemical information couriers). The embodied brain is 'programmed', so to speak, to prime a special relation to others so that their needs are seen to be

just as important, and in some circumstances even more important, than the needs of the individual self. The neuropeptides oxytocin and vasopressin have a common evolutionary history. Whereas the oxytocin is popularly known to promote maternal care, nurturing and affiliative bonding motivations, vasopressin, more prominent in males due to its relationship to testosterone, does not only support bonding but also territoriality and aggression, that is, it plays a role in a mammal's efforts to defend a territory it shares with those it bonds with.

Mammalian emotions are prominent in films, in particular romantic films, melodramas and children's films (Kramer forthcoming; Grodal 2009). The motivations for anger and fear are often care-based as in the action film *Die Hard* (John McTiernan 1988) or the historical drama *Gladiator* (Ridley Scott 2000), where the deeper motivations behind the violent acts performed by the hero are to protect their families. Genres such as comedy, melodrama, and romance, are based on active bonding and care, whether in the positive approach-versions or in the negative avoidance-versions based on panic and sadness related to bonding in jeopardy, where the social bond between individuals can be disrupted by death or permanent separation as in the melodrama *Titanic* (James Cameron 1997). Comedies often concentrate on the playful regulation of care and empathy by emphasizing human misery. Sometimes comedies create scenarios that allow the viewer to laugh heartily and playfully at all human follies. Other times, however, comedies create scenarios that, as claimed by the philosopher Hume and others, invite viewers to laugh more aggressively at other people's misfortune. Laughter is related to the central mammalian motivation : playing. Crying and laughter are two central and related regulators of emotions. Most especially, they regulate emotions linked to empathy and social bonding (Grodal 1997; Grodal forthcoming).

Very successful films such as *Titanic*, *Die Hard*, *Saving Private Ryan* (Steven Spielberg 1998) or *Pretty Woman* (Garry Marshall 1990) have bonding and bereavement as the superior emotional motive illustrating how the motivational power of oxytocin-vasopressin-based bonding is a patent motivation for our species, often much stronger than sexual urges and aggression. However, the power of social bonding with infants, mates, relatives, and groups may lead to substantial conflict when it comes to balancing and negotiating motivations and obligations across different social bonds. From Sophocles' *Antigone* onwards, a central theme in fiction has been the tragic consequences of conflicting duties : the film adaptations of *Romeo and Juliet* describe the conflicts between pair bond and kin-bonds; the melodrama *The Bridges of Madison County* (Clint Eastwood 1995) presents the conflict between the adult love-bond and the mother-child bond; and in *The English Patient* (Anthony Minghella 1996) a conflict between a love bond and a tribal bond provides the narrative plot. Films often present viewers with strategies for how to calibrate motivations which tend to surface within

different types of social bonds (Kramer forthcoming).

The bonding mechanisms found in humans have broadened during evolutionary time so as to support not only the mother-child-bond but also the father-child-bond, as well as pair bonds and wider social bonds among kin and within tribes (groups) (Kramer forthcoming; Grodal 2009; Fisher 2004). The human urge for group bonding and altruism has been a heavily discussed topic in the field. In the 1960s and 1970s, the prevailing argument was that genuine altruism was impossible due to the so-called 'free-rider problem': in the face of genuine altruism, cheater and criminals would exploit the altruists and take over. This individualistic turn was famously put forth in evolutionary theorist Richard Dawkins' *The Selfish Gene* (1976). The last twenty years have seen, however, a series of arguments that criticize the conception of individual 'selfishness' as the basis of humanity.

The anthropologists Boyd and Richerson (1998) argue that humans are 'ultra-social'. Humans are primarily members of a social group in relation to which they articulate their individual subjectivity. According to this view, the success of humans is not only based on survival of the fittest in a pure 'reptilian' fashion, but also on their aptitude for cooperation, empathy, and altruism (see also Haidt 2012; Boehm 2012). One of the reasons why humans can avoid being held hostage to the duplicity of free-riders and cheaters is that they can establish moral norms as well as sundry forms of punishments for cheaters. Crime fiction often articulates the importance of upholding moral norms (Grodal 2010). However a disadvantage of this 'groupishness', our reliance on group bonds (Haidt 2012), can be seen in war films where bonding between brothers in arms and tribal bonding entails a demonization of 'the other', as in *The Lord of the Rings* series (Peter Jackson 2001-2003) (Grodal 2013a).

The Embodied Brain, Mirror Resonance, and Simulation

The motivation for bonding behavior is supported by a series of brain mechanisms related to the representation of the emotional states of others – primarily empathy – and to the communication of feelings and intentions. These psychological mechanisms are central to the film experience since it is based on communication related to the bonds between humans in real life as well as between viewers and film characters. The film experience is embodied: the brain and the body – even viscera and the skin – constantly resonate in accordance with the film's flow, with changes in muscular tension, perspiration, stomach state, etc.

In order to understand our ability to share other people's emotions, cognition, goals, and lives, we have to turn to human developmental and cognitive theory and take a look at the onset of intersubjectivity.

The last four decades of developmental research suggests that young infants are not as 'ego-centered' as previously speculated by prominent development theorists such as Sigmund Freud and Jean Piaget (Bråten 2007). Rather it seems that very young infants are highly sophisticated social beings mentally, and bodily wired to relate to others. Their innate propensity to communicate and share experiences with other agents can be characterized by what social psychologist Stein Bråten (2007) has called 'alter-centric participation', which is the

innate capacity to experience, usually out of awareness, what another is experiencing. It is a non-voluntary act of experiencing as if your centre of orientation and perspective were centred in the other. [...] It is the basic intersubjective capacity that makes imitation, empathy, sympathy, emotional contagion, and identification possible. (Stern 2004 : 241–242)

The developmental psychologists Meltzoff and Moore have observed that a group of newborns from 42 minutes to 72 hours of age successfully perform facial imitations of adult behavior (1989; 1983). Such spontaneous imitations came as a surprise because the Piagetian school previously had upheld that the developmental milestone for imitation arrived around the child's first birthday (Meltzoff & Decety 2003). In an earlier study (Meltzoff & Moore 1977), infants at 12 to 21 days of age showed an ability to imitate manual and facial gestures, based on their disposition for attuning their own facial and manual gestures to those of someone else.

Such an innate capacity for shared face-to face interaction is crucial for the understanding of subject-to-subject (viewer-to-character) interaction characteristic of film viewing and character engagement (Kramer 2010). Interacting with moving images and fictive characters (and their projects) relies on an 'intersubjective model' in which the viewer's mental apparatus plays an active role (Grodal 1997; 2009). The viewer's mind-brain consists of affective and cognitive processes, which have been selected over evolutionary time. Some of these processes enable viewers to care for, share, and seek to understand other agents' beliefs and emotions, especially agents, who are 'like' the viewer in some manner or other (see Meltzoff & Decety 2003).

The ability to represent someone's mental states (intentions, emotions, and beliefs, etc.) is usually called a *theory of mind*, whereas *empathy* refers to the ability to share and understand another person's emotion. On a daily basis, and most often without conscious awareness on our part, in or outside the cinema, we easily *empathize* with other agents when they are in pain – in the sense that we automatically "resonate" with them in attempting to understand their perspective, investing our own emotions in their situation and sometimes – but not always – feeling emotions similar to their own.

Due to advances in neuroscience over the last twenty years, we now have better insight into the brain mechanisms that make us sociable and

capable of understanding other minds. One of the crucial breakthroughs in research on empathy has been the discovery of a cluster of brain cells in the premotor cortex – the so-called ‘mirror neurons’. (The premotor cortex is an area of the brain that plans the execution of muscular or motor action).

Mirror neurons were first discovered accidentally in the lab of neuroscientist Giacomo Rizzolatti and his colleagues in Parma, Italy, during experiments done with macaque monkeys in the early 1990s (Gallese & Stamenov 2002; Keysers 2011). Mirror neurons are special because not only do they discharge when the monkey intends or performs a goal-directed action, say grasping a raisin, but also discharge when it sees another monkey or any other agent performing a similar action. Later research has suggested the human brain possesses neurons identical to those discovered in macaque monkeys.

The resonating mechanisms consist in linking visual experiences, say of one’s own or another person’s hands, with the brain pattern in the premotor brain activated when one is planning the execution of such an action oneself. As the motor action system is linked to the goals of actions, according to this view, we resonate (or *simulate*) the action of the other person by activating our own motor neurons. In this manner, vision is coupled to preparatory stages of action (Grodal 2009). An important aspect of the mirroring of the muscular activity of others is mimicry : the possible resonance of the facial expressions of others is vital to social interaction in real life as well as central to the film experience.

Emotional resonance also connects to a different brain area, the insula, which is vital to the emotional experiences of pleasure, pain, and disgust. The insula connects deep feelings of visceral and other body states by mechanisms that consist of emotions understood as older in terms of evolutionary history, and higher, newer mental functions situated in the frontal cortex (Damasio 2010). Thus, when we witness pain or pleasure manifesting itself in the facial features of a character we tend to mimic these features and emulate their facial expression (an activity primarily performed in the frontal cortex); moreover such mimicking activates those very same areas in the brain that would be activated were we to experience the very same pain or pleasure. Therefore, in a profound sense, our embodied brain is capable of sharing the pleasure and pain of others. The facial expressions of others do not need first to be interpreted cognitively before subsequently inducing empathic reactions, as implied in the theory-of-mind framework (see Baron-Cohen 1995). They have a direct, visceral impact on us generated via mirror networks (Keysers 2011).

Further, damage to the insula will make it impossible not only to have experiences like pleasure or disgust, but also to interpret other people’s expressions of pleasure or disgust. Our brains are directly wired to resonate with other people’s feelings, and the film experience directly

taps into the way our brains are wired and enable us to be ‘ultra-social’.

Besides the premotor cortex and the insula, a third brain area has mirror capabilities. This is the somatosensory cortex located at the top of the brain which provides body maps related to the interaction of body surfaces (Keysers 2011). If you cut your finger or see somebody else cut their finger or have their finger caressed, the finger area of the somatosensory cortex provides the mirror relay for the experience of pain or pleasure. We can activate a somatic vicarious feeling as if we ourselves were feeling pain or pleasure when we see others experiencing these feelings, especially in circumstances where “attention is directed towards the somatic cause of the pain [or pleasure] of others” (Keysers *et al.*, 2010 : 424).

Films that provide interaction with the body surface may thus induce similar feelings in the viewer. In *Titanic*, the young couple, Jack and Rose, stand at the stem of the ship holding each other, sealing their emotional bond. The camera lingers on the couple holding hands – a classical non-verbal ‘tie sign’ of belonging. Attention to the characters’ hands provides the viewer with a privileged access to the characters’ embodied and phenomenological experience, allowing viewers to feel the physiological belonging *as if* they were present in the scene. In Jane Campion’s *The Piano* (1993), a husband, in a fit of jealous rage, amputates his wife Ada’s index finger. The editing of the scene cross-cuts between Ada’s struggle, close-ups of her hand, her distressed daughter and her furious husband with an axe, introducing close-ups of Ada’s face expressing fear, contempt, sadness, as well as views of her wound. This offers the viewer a physically powerful sensation of the character’s horrific experience.

Even if we are strongly connected to other people via empathic resonance, we also have inbuilt modulatory functions in the understanding of other peoples’ mental states. In a renowned experiment conducted by the German neuroscientist Tania Singer and her research team (Singer *et al.* 2006), subjects were privy to the alleged fictional corporal punishment of individuals who had either played fairly in a game or had cheated. The experiment revealed that the empathic ‘mirror’ pain reaction in the subjects was modulated according to whether the person who received punishment, had cheated or not. When punishing the “cheaters”, the pain-reaction in the insula was slightly lower among the female subjects, while it was simply non-existent among the male subjects. The male subjects also had activation in other brain areas linked to reward and pleasure associated with punishment. Such regulatory mechanisms can highlight what happens when screen villains receive painful punishment and fail to elicit empathic pain in the viewer. As Richerson and Boyd (2005) have argued, our ‘ultrasociality’ is ‘tribal’ : we care and bond with those that belong to our group, but we are also capable of treating out-group persons as objects, in which

case, consequently, we are capable of blocking our ability for empathy (Grodal 2013a; 2013b).

Empathy and Character Engagement

Many film scholars have previously argued that the film identification process relies primarily on a third person perspective model, where the viewer ‘assimiliates’ the character’s situation or position either immediately during the viewing or in later reflection (Carroll 1990a). This argument relies on a theory-of-mind perspective in which the viewer’s cognitive modeling of the character is the main process for viewer engagement. In this view, the cognitive modeling may lead to a ‘feeling for characters’ instead of ‘feeling with characters’ (Neill 1996).

For example, in the comedy drama *Stepmom* (Chris Columbus 1998), we meet a newly divorced – and cancer suffering – mother of two children. In an affect-laden scene the mother says goodbye to her children, presenting them with individual gifts. According to a third person perspective, the viewer would not feel emotions similar to those of the mother (pain, regret, anger and sorrow due to the intolerable situation). Rather, the viewer would feel sorry for the character as well as concern for her situation. This might be right in some cases. However, as scenes of bereavement have universal significance for viewers, this segment invites empathetic engagement more directly. The facial expression of sorrow that builds up on the mother’s face, before she manages to control her emotions, helps the viewer to feel pain, the facial feedback and imitation inducing sadness in the viewer. In particular, films addressing social bonds are characteristic of a particular pedagogical style that “blows up” facial expressions in close-ups and emotional point of view shots that are ‘larger than life’ (Kramer forthcoming; Kramer & Grodal 2010; Bordwell 1985).

Often assimilation is used synonymously with sympathetic engagement, the ability to feel concern and care for another person, fictive or real. A third person perspective of character engagement sees ‘identification’ as a problematic term for describing character engagement, since identification implies indirectly that the viewer “becomes” the character in an isomorphic sense (Smith 1995; Carroll 1990b). However, the experience of other people exclusively from a third person perspective is not in tune with the neuroscientific account of social cognition and is insufficient as the overarching engagement model for film viewing (Grodal 2009).

This does not mean that a cognitive perspective on character engagement is unimportant, nor that empathic resonance is always automatic, (cf. the Singer experiment, according to which empathy can be blocked). In order to assimilate a character’s situation, the viewer must have a sense of the character’s “position”. Sensing the latter is an embodied process and derives from watching the character’s actions,

her point of view as structured and framed by the film, as well as imagining or directly experiencing, for example, a character's bereavement in a given situation (Kramer forthcoming). Engagement is fed by the viewer's own previous experiences of pain and loss, which can influence the 'like me' framework – depending on the relationship between viewer and character. Sometimes a character will not invite the vicarious sharing of emotions. The character's actions or the situation they are in could be too farfetched for the viewer to allow empathy; in the latter case conscious simulation by the viewer might be required in order to understand the character (Smith 1995). The director's lack of craftsmanship might also fail to encourage empathetic resonance, despite their intentions. In all, engaging with fictional (and real) others is a "plastic" process that depends on a number of factors – especially the viewer's relation to the other agent : how does the viewer appraise the context? (is the fictive scenario relevant to me?); how is the plot's point of view framed? how willing is the viewer to engage, and how naturally inclined is he to empathy?

Empathetic understanding is probably the default mode of human engagement building on the recruitment of the neural circuits used in our own first-hand experiences with a situation in order to understand and share the experience of another agent. Empathy can occur either directly in a (possibly simulated) affective resonance or via the imagination. Empathetic engagement with fiction can be defined as the capacity to vicariously feel – at least, to a certain extent – what a target character is feeling on the basis of perceptive cues of affect and action and/or the imagination (Bruun Vaage 2009; Grodal 2009; Singer & Lamm 2009).

Not all people – and cinema viewers included – are equally disposed to empathize. The degree to which people empathize varies according to their dispositions, psychological makeup, and experiences. Brain scans performed by the neuroscientist Mbemba Jabbi (cf. Keysers 2011) showed that viewers' reactions to emotionally charged scenes in films were closely related to their answers to a questionnaire measuring their general level of empathy.

Emotion Regulation in *Sophie's Choice* and *Stepmom* : A Brainscan View

A fascinating new vista into the brain's emotional activation of empathy and sympathy has recently been opened by Israeli film scholar and neuroscientist Gal Raz in collaboration with a team of neuroscientists, including most prominently Talma Hendler (Raz *et al.* 2012).

The team showed two film clips to 31 people who were placed in a fMRI brain scanner, which measures the subjects' brain events on the basis of their blood variation. The two clips were taken respectively from Alan J. Pakula's drama *Sophie's Choice* (1982) and the comedy-drama *Stepmom*, mentioned previously.

In the scene excerpted from *Sophie's Choice*, the titular heroine is transported to a concentration camp. A Nazi officer presents her with the unbearable choice of deciding which of her two children, a boy and a girl, should be killed so that the other may survive. If Sophie does not choose, both children will be killed. At first she evidently refuses. However, motivated by the fear of losing both children, she lets the girl go, a choice that marks her forever and is filmed in affect-laden close-ups communicating the traumatic event played out on Sophie's screaming face, the anxious face of her children, and the stern face of the officer.

During the viewing, brain scans were centered on three areas : two of these areas relate to the brain's capacity for cognitive control and the other area is within the limbic group, which consists of relatively primitive brain structures, that are central to the generation of emotions. The limbic center, responsible for empathic grief, was highly activated during the viewing of the aforementioned scene. At the beginning of the clip, the brain scans pointed to links between the cognitive centers and the limbic center, indicating that some cognitive regulation was activated by the sadness induced by the scene. At the peak moment, when Sophie chooses to sacrifice her daughter, the regulation taking place between cognitive and core limbic centers almost disappeared. Some cognitive control reappeared at the moment when the scene cuts to a flashback where we see Sophie chronicle her traumatic story.

The brain scans suggest that cognitive control collapsed in the viewers during the most traumatic moment, that of the choice. Furthermore, the measurement of the viewers' arousal indicated that the viewers felt anger that blended with empathic sadness. Probably the cruelty of the Nazi officer elicited anger and sadness in the viewers.

In the clip from *Stepmom*, viewers witness a mother telling her son that she is about to die. Brain scans showed that this induced a flow of activation of the limbic centers for sadness, and that the limbic activation became weaker, and was regulated by the cognitive centers, as the sadness increased. As the mother in the film is able to soothe the boy with comforting words and presents him with a gift she has made for him to remember her by, viewers increasingly regulated their empathic emotions, which were highlighted in the brain scans by strong links between cognitive and limbic centers. Physiological measurements indicated that the sadness was one of resignation and sympathy.

This study illustrates how film viewing can regulate pain, care, empathy and sympathy, and how viewers – guided by the narrative and aesthetic orchestration of a film – process filmic events by empathic resonance and how active cognitive regulation may break it down and induce an unregulated empathic resonance.

Imitation and Attunement

Even if empathic resonance is based on innate dispositions, it is dependent on a life-long process of attunement to other people in real life situations and on the screen. Meltzoff and Moore (1997) proposed that infants are born with a body schema that allows them to use and integrate different types of sensory data from different modalities (proprioception, touch, hearing, sight, taste, and smell). Meltzoff and Moore call this capacity 'supra-modality', which stresses that we are born into this world with the capacity to take in information, transform it into a representation from the senses, adjust the representation, and let that information carry over to another sensory modality. We are further able to link information from different sense modalities with information from the motor action system. As argued by evolutionary theorist Ellen Dissanayake (2000), following the work of developmental psychologists Daniel Stern (1985) and Colwyn Trevarthen (1979), the arts have evolved to represent and take advantage of the human disposition for intersubjectivity and attunement deeply rooted in social-emotional needs for emphatic sharing, and by drawing on themes of crucial value to humans (Kramer, forthcoming). In films concerned with social bonding, music plays a significant role, adding to the emotional significance of a scene, for example by inducing emotional regulation. As we shall argue, film music draws on cross-modal integration.

We can refer to these central emotional episodes as 'paradigm scenarios' (de Sousa 1987; see also Carroll 1990b). Paradigm scenarios are our first experiences with core emotions that we learn to link to different situations. They derive from real life experiences and experiences with the arts (Kramer forthcoming; de Sousa 1987). An early form of paradigm scenario is *Motherese*, the interaction – through words, sounds, gestures and rhythms – that characterize early caregiver-infant interaction, which possibly has a universal background and forms an integral part of 'proto-conversation' (Dissanayake 2000). Affectionate expressions and contact between caregiver and infant – so-called dyad interactions – are characterized by facial displays, gesticulation, body movements and rhythmic sounds. Dyad interactions create a mutual dance playing on different sense modalities: the caregiver responds to the infant's expressions, movements and babbling with facial and voice modulations (*Motherese*/babytalk), gestures and body movements. This packet of sensory information shared by the caregiver and the infant manifests itself in infant imitation and settles in the caregiver's affective resonance, sensing and regulation of the infant's affect (so-called 'affective attunement', Stern 1985).

In *Stepmom* (the drama *Terms of Endearment* [James L. Brooks 1983] contains a similar scene), the viewer can follow the mother's face, which communicates controlled pain to her children when she says goodbye knowing she is about to die. In this manner, the viewer is given

an opportunity for intersubjectivity and can respond to the children's facial and bodily reactions as well as the mother's eyes, face, and non-verbal signs of affection, thereby reactivating central socio-emotional and intra-physical processes in the viewer in a direct response to the scene.

Emotion Regulation by Emotional Attunement

Attunement is probably one of the earliest signs of the development of empathy but it is also different from it. Attunement is a process whereby a common ground and shared emotions are established, not just transferred from one person to another. In the experience of attunement it is central that the attuning participants experience the attachment that is provided by the *aesthetic* activities. By *aesthetic*, we mean the use of perceptual and socio-emotional elements like sounds, movements or visual elements for a communicative purpose.

Attunement thus points to the processes that regulate emotions by means of sharing emotions and providing perceptual and motor aesthetic forms, forming a packet of intermodal aesthetic elements as best illustrated by *Motherese* (Dissanayake 2000). The evolutionary psychologist Robin Dunbar (1996) has proposed that the origin of language can be explained with regards to the needs of primates in the sense that language can help regulate their emotional wellbeing in a way similar to grooming. Language, according to Dunbar, first evolved as a means to transfer tactile-based grooming to acoustic 'grooming' to enable group formation, as grooming is often a dyadic activity that cannot be expanded for group bonding at group level. The purpose of grooming is emotional regulation by bonding. Those aesthetic forms that have ritualistic origins, such as dancing, choral singing or music, can be seen as comparable forms of social grooming. Operas, ballets or films also mold different perceptual and motor elements into aesthetic patterns that may provide social regulation of emotions.

In Puccini's opera *La Bohème*, words, music and visuals regulate the deep empathic pain of seeing a loved one die by inscribing it into an aesthetic form that provides a social platform for the emotional experience. Film viewing is equally a ritualistic activity because not only do we empathize with and attune ourselves to the characters; we also attune ourselves to the other viewers we share space with when viewing a film in a theatre. Attunement in the cinema operates both explicitly and implicitly : viewers are intersubjectively and implicitly attuned to the characters on the film screen and explicitly attuned and attached to other viewers by the way in which the artifactual aspect of the film signals that viewers are part of an aesthetic-emotional community. When watching sad melodramas, viewers are offered the opportunity to cope with grief within socially regulated forms similar to the way in which burial ceremonies provide social forms for dealing with grief – as in *Saving Private Ryan* which begins and ends with a display of grief

set at a graveyard.

In the bereavement scene in *Terms of Endearment*, the shared grief is regulated by a short and low melody that returns later with more prominence as background music during the post-burial gathering. This extradiegetic aesthetic element regulates our empathic resonance by framing it as part of a shared social experience. When watching upbeat musicals, it is the shared and socially molded experience of happy feelings of bonding that the audience undergoes. Film viewing is undoubtedly a personal experience, but it is also a social ritual by which viewers bond and establish values or confirm a set of shared emotions.

Film music is one of the prominent aesthetic features that serve emotional attuning and emotional regulatory functions. Music is centrally a human activity that provides an experiential binding together of people. Historically music has been heavily integrated with ritualized behavior, dance, burial, wedding, religious ceremonies, etc. (Dissanayake 2006). Music is often described as expressing emotions, although the precise relation between music and emotions – a widely discussed topic – has not yet been clearly established.

One prominent cluster of theories points to a relation between music, emotional regulation and mother-infant interaction. The affective neuroscientists Jaak Panksepp and Günther Bernatzky (2002) have hypothesized that there is a link between sad music and mammalian distress calls in the sense that music and distress calls share neurological underpinnings, and that music functions as a pain softener, (or as grooming, one might say) by the release of oxytocin during distress. Similarly, the ability to relate to others, argues Patricia Churchland, is probably an “extension of the feeling of awfulness that arises in mammals when our infants are distressed or separated from us, and when they make distress calls” (2011 : 152-53). Churchland’s perspective corresponds well to the fact that we normally respond more affectively and empathically to those with whom we are most closely tied : for example, parents tend to feel their children’s pain most powerfully. The German researchers Wernke and Mende (2011) have proposed that music is linked to contact between grown-ups and infants. Distress calls of animals and especially human infants, they argue, have evolved into having distinct acoustic patterns. Wernke and Mende hypothesize that these acoustic patterns provide the basis for our ability to make and appreciate music, and point out that crying is the first cross-sensory activity during ontogeny : the child cries, hears its own crying, and thereafter fine-tunes its expressions to receive care and protection. According to this view, music partly has its roots in social communication that aims at regulating basic attachment needs.

In the key moment of *Titanic*, mentioned earlier, the camera moves around the romantic couple in a loop activating a mental and bodily representation both of the uncertain feeling of first love and of the dizzy

feeling that comes from standing on a high platform looking down at the ocean. The music is at first subtle, but swells and thus supplements the breathtaking and powerful experience of love in the early phase of infatuation. The developmental psychologist Daniel Stern (1985) has described how the infant's biological and physiological rhythms become activated in different regulative experiences of arousal in interactions with the caregiver. He calls oscillations in arousal experiences 'vitality effects', which can be described as dynamic kinesthetic expressions such as roaring, bussing, crescendo, decendo, etc. (Hart 2006). In the scene from *Titanic*, the growing, embodied slightly dizzy feeling of uncertain love, is attenuated by the music that lifts 'up' the bonding scenario of love. The escalating musical intensity becomes bodily grounded in this manner, which will give rise to an associative net of bodily-related attachment scenarios in the viewer.

In Conclusion

This article has argued that films concerned with bonding tap into psychological mechanisms that are grounded in mammalian dispositions for care, which have been further developed in humans during evolutionary time. Our willingness and ability to emotionally resonate sad experiences as in melodramas, and be touched by sad (film) music, is central to our willingness to feel with others, as well as share and cope with their miseries (as well as their happiness).

We have discussed how the central aspects of our ability to resonate with the emotions of films has evolved from mechanisms that support vital socio-emotional caregiver-infant interaction, examining how emotion regulation by means of multi-sensory aesthetic forms grows out of this interaction. Films may be considered rituals of social emotion regulation – and their fundamental ground is the human ability to imitate and resonate which mentally recruits first-person experiences as a road toward the understanding of others.

Finally, we have also pointed to the way in which the film experience consists of a double empathic sharing : the sharing of emotions with characters and the sharing of emotions with other physically present or imagined viewers. This stems from a deep urge to bond (and groom) with others in states of pleasure or pain. It is this very urge which undergirds our human ability to "resonate", while our "ultrasociability" provides us with some protection against the knowledge we have of our own vulnerability.

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Abstract

This article discusses the role of empathy based on evolutionary, human developmental, and neuropsychological theories in combination with film theory and analysis in order to explain the film viewer's emotional reactions primarily to painful fictive scenarios.

Résumé

Prenant pour base les théories évolutionnistes, développementales et neuropsychologiques, alliées à la théorie et à l'analyse filmiques, cet article examine le rôle joué par l'empathie dans les réactions émotionnelles que provoquent, chez le spectateur, le visionnement de films de fiction à "forte charge émotive".

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