Forthcoming in *Handbook of Posthumanism in Film and Television*, eds. Hauskeller, M., Philbeck, T., and Carbonell, C. Palgrave Macmillan, 2015.

At home in and beyond our skin: Posthuman embodiment in film and television.

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Introduction

Film and television portrayals of posthuman cyborgs melding biology and technology, simultaneously "animal and machine" (Haraway 1991, p.149), abound. Most of us immediately think of iconic characters like Arnold Schwarzenegger's relentless cyborg assassin in the *Terminator* series or Peter Weller's crime-fighting cyborg police officer in *Robocop* (1987). Or perhaps we recall the many cyborgs populating the *Dr. Who, Star Trek*, and *Star Wars* television series and films—including Darth Vader, surely the most famous cinematic cyborg of all time. But lesser-known explorations of cybernetic embodiment have appeared in film and television for many decades. And not all portrayals involve the sort of extreme transformations exemplified by these iconic characters. This chapter considers some of different ways that film and television have explored the transformative relation between embodiment and technology.

Historical Background

There is rich and varied cinematic history exploring the bounds of technologically-enhanced embodiment. Perhaps the first on-screen cyborg can be found in *The Colossus of New York* (1958), where the brain of an acclaimed scientist—severely injured in a car accident after winning a Nobel Peace Prize—is transplanted into a robotic body by his neurosurgeon father. Predictably, this project does not end well. But more cyborgs soon made on-screen appearances. Dr. No, the evil mastermind in the first James Bond movie—the 1962 film starring Sean Connery bears his name—is a cyborg sporting robotic arms, implanted after Chinese mobsters cut off his hands, that give him superhuman strength. *Cyborg*

2087 (1966) emerged a few years later. It tells the story of a cyborg sent back in time from the year 2087 to 1966 by a group of "free thinkers". His mission: prevent the development of technology that will eventually enable mass mind control. More recently, *The Machine* (2013), a slick, low-budget indie sci-fi thriller, explores different varieties of cybernetic augmentation: from severely wounded soldiers being resuscitated as powerful fighting machines via neural implants and specialized prosthetic limbs, to the remnants of a murdered artificial intelligence researcher's neural information being transferred into a self-aware, morally conflicted robot killer bearing her physical likeness.

Despite an understandable tendency to associate cinematic cyborgs with menacing characters like the Terminator or Darth Vader—these are the characters that seem to endure in our imagination, due both to the extent of their technologically-enhanced transformations (who can forget Vader's ominous cybernetic armor and mechanical breathing?) as well as the high-definition havoc they wreak—there are nevertheless friendlier examples of film and television cyborgs, too. For example, the television show *The Six Million Dollar Man* (1974-1978) chronicles the adventures of Steve Austen, an American astronaut who suffers a devastating accident while testing an experimental aircraft. He barely survives; his right arm, legs, and left eye are replaced with advanced "bionic" implants that give him superhuman strength, speed, and vision. The newly-constructed "bionic man" eventually goes to work as an agent for a top-secret US government office, heroically battling evils all and sundry. Cyborgs have also caught the imagination of young viewers. Although the film is largely forgettable, *Inspector Gadget* (1999)—based upon the popular television cartoon series of the same name—is essentially a *Robocop* for children. It tells the tale of John Brown, an earnest but bumbling security guard who, after being severely injured while attempting to thwart a robbery, wakes up to find that his damaged body has been retrofitted with a host of different on-demand technologies and gadgets enabling him to become a more effective (if still somewhat bumbling) crime fighter.

Two things stand out from this brief survey. First, most on-screen portrayals of technologically-augmented embodiment stem from dramatic *medical* interventions, primarily the need to physically recover from some kind of catastrophic accident resulting in the loss of limbs, other body parts, or one's entire non-neural body (e.g., *The Colossus of New York*). Even Darth Vader's ominous black armor has a critical biomedical function. It consists of both prosthetic limbs as well as a portable life-support system enabling Vader to function after sustaining near-fatal injuries while battling Obi-Wan Kenobi. Rarely are non-medical cases portrayed; presumably non-critical cases of cybernetic enhancement lack the requisite dramatic impact. Second, most representations of cyborgs in films are characterized by the extent to which the subject's cybernetic augmentation renders them profoundly *other*. Due to the extreme nature of their technological transfiguration, figures like the Terminator, Darth Vader, Robocop, or even the Six Million Dollar Man have largely escaped the limitations of the flesh. They can access a nearly limitless flow of information—think of the Terminator's enhanced perceptual systems and continually-updated Heads-up Display (HUD) feeding him rich contextual data—and realize mental and physical capacities unavailable to the rest of us. Most of these iconic film and television cyborgs in this way play into what N. Katherine Hayle calls the technophilic dream of "fantasies of unlimited power and disembodied immortality" that ultimately pull the posthuman cyborg out of its organic connection with the social world and into a rarified life of cybernetic transcendence (Hayles 2002, p.6). Of course, these are fictional characters designed to maximize visual and narrative impact. Nevertheless, focusing just on these extreme cases does potentially obscure a more nuanced understanding of the way that cyborg realities can facilitate a deeper connection not just with the subject's lived embodiment but also with the social world in which they are embedded.

In what follows, I want to take a more phenomenologically oriented and "situated" approach to embodiment in film and television. Part of the force of the posthuman vision comes from the recognition that technological augmentations of mind, body, and self are not simply exotic possibilities

in the distant future. Rather, these augmentations are already a central part of our everyday lives; they are perpetually in-progress, happening all the time and in ways both small and significant. We are, after all, "natural born cyborgs" (Clark 2003). So instead of focusing on extreme examples exemplified by the Cyborg Holy Trinity of the Terminator, Robocop, and Darth Vader, I want to instead look at more mundane representations of biotech augmentation that arise from a subject's desire to connect more deeply with self and other, that is, a desire to become more deeply enmeshed within the mundane dynamics of our social embodiment. In order to set up this perspective, however, I first consider discussions of "plastic" embodiment and cognitive extension in recent philosophy of mind and cognitive science.

From plastic embodiment to cognitive extension

The plastic body

"Embodiment" is a central theme in current philosophy of mind and cognitive science. This is especially apparent in a family of views that fall under the label "embodied approaches to cognition" (e.g., Gallagher 2005; Gibbs 2005, Shapiro 2014). Embodied approaches to cognition argue that distinctively human forms of thought, perception, and affect are profoundly shaped by both the sorts of bodies we have (their physiology, morphology, etc.) as well as the things they can do (their capacity for movement, action, ability to use and incorporate various tools, etc.). Although embodied cognition theorists endorse a variety of ontological commitments and methodologies, proponents are nevertheless united in their rejection of the mind as something localized wholly in the head. They argue that mind is something that emerges within, and is even at times constituted by, ongoing patterns of world-engaged, world-involving *action*.

Various lines of empirical evidence are routinely summoned to motivate the embodied cognition thesis: for example, studies indicating an apparent link between gesture, thought, and language processing (Goldin-Meadow 2003; McNeill 2005); enactive approaches to perception which argue that perceptual consciousness is constituted by the ongoing exercise of sensorimotor skills (Noë 2004; O'Regan 2011); work suggesting that feeling, perceiving, thinking and speaking about emotions depends upon feedback from somatovisceral and motoric processes (Laird 2007; Niedenthal 2007); and research on so-called "mirror neurons", visuomotor neurons that fire both when an agent performs an action and observes someone else doing it (Rizzolatti and Sinigaglia 2008). These lines of evidence seem to support to the idea that the body-beyond-the-brain makes a nontrivial contribution to both the form and content of our mental life.

But our bodies are not fixed entities. Rather, embodiment is, in a concrete sense, malleable, open—*plastic* (Krueger and Legrand 2009). Bodies are open to various forms of augmentation which in turn generate both structural and functional reconfiguration. One of the ways to bring out this plastic character of embodiment is to look at the various ways that we routinely incorporate and merge with the tools and technologies populating our everyday environments. These body-world couplings are instructive. They indicate how biotech augmentations not only change the physical structure and functional capacities of our bodies. They also reconfigure the *phenomenology* of our embodiment, that is, the way we experience our bodies as well as the way the world is disclosed to us *via* this bodily experience.

Consider the way that simply picking up a stick and using it to probe our environment alters our felt sense of embodiment. After a few moments of habituation, the stick is no longer felt to be an object that we hold, something distinct from us and our agency. Rather, as Merleau-Ponty (1945/1962) famously observed, the stick disappears, experientially speaking; it becomes the transparent vehicle

through which we perceptually access the world. Within this process, we experience a reconfiguration of our local sense of embodiment. When we skillfully deploy the stick to explore our world, we experience our body, as well as its attendant sensorimotor capacities, as extending into and through the stick (Dreyfus and Dreyfus 1999). Moreover, we experience an expanded set of action-possibilities that flow from this newly-expanded sense of embodiment (Hirose 2002). The environment is experienced as affording interactions that weren't there a moment ago: we can reach, poke, probe, and manipulate previously closed-off aspects of our world.

An especially striking example of functional and phenomenological reconfiguration is evident in Paul Bach-Y-Rita's work on sensory substitution, and his technology known as Tactile Visual Sensory Substitution System (TVSS), initially designed to bring vision to blind subjects (Bach-Y-Rita et al 2003). TVSS is a prosthetic visual technology that relies on the body's ability to map information from one modality to another. It operates by transducing visual information from the environment, which enters through a head-mounted camera, into patterns of vibrations conveyed via stimulators in contact with the skin of the wearer's abdomen, back, thigh, or tongue. As blind subjects adjust to the experience of wearing TVSS and begin to move around their environment, they report having quasi-visual experiences of three-dimensional objects—a kind of technologically-augmented *tactile* vision. Moreover, the technology very quickly becomes transparent, experientially speaking. The wearer no longer experiences the technology as an object but rather as something that has been integrated into their body and which helps to disclose the world in a perceptually novel way.

TVSS may seem like the stuff of Terminator-style science fiction. But many similar everyday examples abound: we wear glasses to improve vision, hearing aids to enhance auditory perception, braces to stabilize unsteady joint and enhance balance, and electric wheelchairs to provide mobility. Skilled athletes and musicians routinely merge with their baseball bats and bagpipes, golf clubs and

guitars, and in so doing experience an expanded sense of embodiment and sensorimotor possibilities. The point, then, is that at the level of our plastic embodiment, everyday technologies integrate with our body and in so doing affect both functional and phenomenological change. This is because we are *profoundly* embodied agents, "creatures for whom body, sensing, world, and technology are resources apt for recruitment in ways that yield a permeable and repeatedly reconfigurable agent/world boundary" (Clark 2007, p.279).

The embodied mind, extended

Taking the nature of our plastic embodiment seriously opens the door to a more radical thesis, one very much in in line with posthuman discussions of technologically-augmented personhood (Malafouris 2008; Thweatt-Bates 2011). This is the extended mind thesis (Clark and Chalmers 1998; Menary 2010). The extended mind thesis claims that the physical machinery of mind is not confined to the head. Rather, mental states such as beliefs and memories can be partially realized by artefacts and technologies beyond the boundaries of skin and skull.

In Clark and Chalmer's (1998) classic thought experiment, Otto—who suffers from memory loss brought on by a mild form of Alzheimer's—carries a trusty notebook with him wherever he goes. Any time Otto picks up some new information, he records it in his notebook. When he needs that information (e.g., when he wants to remember the location of MoMA in New York so he can go see an exhibition), Otto simply consults this ever-present notebook, retrieves the information, and acts on it. According to Clark and Chalmers, this is a case of extended cognition. Some of Otto's dispositional beliefs—such as his belief that MoMA is on 53rd street—are housed in his notebook. This is because the information in the notebook is *functionally poised* to play the same role that brain-bound information plays in non-extended cases, i.e., cases where an individual appeals purely to their internal bio-

resources to accomplish different cognitive tasks. Otto's long-term beliefs are thus not all inside his head.

We need not appeal to thought experiments or science fiction narratives to further motivate this idea. Consider real-world memory augmentation. Smartphones and portable calendars help us recall appointments and phone numbers; affixing a yellow sticky note to the side of a computer monitor or by the door prompts recall of to-do items; even social and cultural practices and institutions (political structures, religious rituals, legal systems, etc.) play a cognitive role by encoding the complex web of historical narratives, memories, beliefs, and procedural knowledge collectively learned over many generations (Gallagher 2013). When we engage with these external structures and processes, we bootstrap our biological capacities—and within this ongoing engagement "the human organism is linked with an external entity in a two-way interaction, creating a *coupled system* that can be seen as a cognitive system in its own right" (Clark and Chalmers 1998, p.8).

In its original formulation, the extended mind thesis was thought to apply to non-conscious cognitive states (e.g., dispositional beliefs) but not necessarily to conscious mental states, such as emotions (Clark 2009; cf. Hurley 1998; Rowlands 2003). Little was said about the *phenomenology* of self-world couplings extending mind into the environment. But recent developments have lifted this constraint. Extended mind-style approaches have now been applied to various domains such as perceptual consciousness (Auvray and Myin 2009; Ward 2012), aesthetics (Krueger 2014; Cochrane 2008), social cognition (Gallagher and Crisafi 2009; Theiner et al 2010), and emotion research (Kruger 2014; Slaby 2014; Colombetti and Roberts 2015). Taking seriously the *experience* of augmenting and extending our embodied and cognitive capacities in various ways is an important feature of these new directions.

This is where a return to phenomenologically-sensitive portrayals of situated embodiment in film and television becomes pertinent. I now consider two films that might initially appear to have little to do with one another: Christopher Nolan's *Memento* (2000) and Mick Jackson's made-for-TV movie, *Temple Grandin* (2010). Despite their very different subject matter, both films explore interrelated dimensions of embodiment, technologically-mediated cognitive extension, and interpersonal relations.

"Really comfortable in my own skin": embodiment in *Memento* and *Temple Grandin*

Christopher Nolan's psychological thriller *Memento* (2000) follows Leonard Schelby as he frantically hunts for his wife's killer. This task is complicated by the fact that Leonard suffers from a severe form of anterograde amnesia; after suffering a blow to the head, he has lost the ability to form new memories, and many of his previous memories are now hazy and incomplete. The last thing Leonard remembers is intervening in his wife's assault. He vaguely recalls shooting and killing one of the people responsible for the crime before being hit on the head by another assailant, moments after watching his wife die. Understandably, Leonard is now driven by an obsessive desire to find his wife's killer and exact his revenge.

But we soon learn that things are not this straightforward. First, Leonard's motives may not be as noble as they initially appear. He willingly clings to a fabricated memory of a blissful marriage that, in reality, was deeply conflicted and probably violent. As his investigation unfolds, Leonard destroys all evidence compromising this fabricated reconstruction; he actively manipulates his memory in order to forget undesirable facts. Additionally, we soon come to see that Leonard's associates—a corrupt former cop and a barmaid with a checkered past—are exploiting Leonard for their own agendas. Leonard's rage-fuelled drive for revenge (including his eagerness to kill, if necessary) and his profoundly compromised memory render him supremely vulnerable to their ongoing manipulation. As he copes

with his unreliable memory and struggles to cling to fleeting moments of clarity, the viewer realizes that Leonard is caught up in a complex network of half-truths and lies—many of them of his own making.

The dizzying dramatic impact of *Memento* comes from its narrative style which brazenly flouts the conventions of linear storytelling. As the story unfolds, we are taken directly into Leonard's fractured experience: color sequences are interspersed with black and white sequences; the beginning and ending of events are spliced atop one another, confounding the meaning and context of different key occurrences and potentially opening up new lines of interpretation and significance. The effect of this fractured narrative is that the viewer gets a firsthand taste of the *phenomenology* of Leonard's experience of a perpetually unstable world; we empathize, experientially, with his inability to find a firm narrative foothold in order to make sense of what is happening before each present moment withdraws into the darkness of his amnesia.

So how does he cope? Even in his compromised state, Leonard still has access to many of the same cognitive resources that all natural born cyborgs do: his body and the surrounding environment. Leonard exploits these resources in a desperate attempt to stabilize his memory and retain new information. He collects scraps of paper, receipts, notes, and diary pages. He annotates Polaroid photos of important places and objects. Crucially, Leonard systematically organizes this information and places these artefacts in particular locations as memory prompts; since Leonard wakes up each morning with no memory of the previous day, this ritual of setting up the environment to reliably trigger a cascade of memories becomes a critical exercise. Leonard has, in effect, transformed a difficult cognitive problem (i.e., remembering complex information) into a much simpler *perceptual* problem by skillfully engineering his cognitive environment.

But Leonard quite literally has another trick up his sleeve. The most important information Leonard acquires is tattooed onto his body. Over time, Leonard's skin is gradually transformed into a

cognitive prosthesis, an external memory device that exhibits a stability and reliability Leonard's neurobiological memory lacks. Leonard's body thus remembers the things his brain cannot. Collectively, then, Leonard attempts to use these memory-augmenting technologies—again, including the surface of his own body, now deliberately reconfigured into a cognitive prosthetic—to slowly build up a stock of new beliefs about the mystery of his wife's death and in so doing establish a bedrock of long-term knowledge that will, he hopes, lead him to his wife's killer.

One of the many compelling embodiment-related themes in *Memento* is its exploration of what Leonard both gains *and* loses by relying on his body and environment so deeply. For, although these embodied strategies and resources enhance Leonard's recall ability, they also render him extremely vulnerable. One of the consequences of Leonard's functional reconfiguration of his embodiment (i.e., turning his body primarily into a memory storage device) is that Leonard's *experience* of embodiment is profoundly altered. Leonard no longer simply inhabits his body as a subject; it ceases to be the transparent medium through which Leonard encounters the world. In virtue of his deep cognitive reliance on his body's ever-increasing number of tattoos, his body is transfigured primarily into an *object*, another technology used to store and access crucial case-specific information. This is reflected in the way that Leonard spends a great deal of time simply looking at his body, standing in front of a mirror while studying his tattoos and trying to piece together the clues they hold. Leonard's relation with his embodiment in this way becomes as fractured and vulnerable as is his relation with the environment. He no longer inhabits his body transparently. Rather, as essential parts of his externalized memory, both Leonard's carefully curated collection of notes and photographs as well as the tattoos on his body occupy a contested public space vulnerable to manipulation and sabotage by others (Sterelny 2004). His memories are no longer his alone; they inhabit a public domain and are therefore open to the deception and hidden agendas of other people. Indeed, we soon see that many of these externalized memories *are* sabotaged by others, including Leonard's manipulative associates as well as "other" Leonards from

previous days and weeks the present-day Leonard can no longer recall. Leonard's functionally augmented embodiment is thus a source of both intimacy and alienation, security and vulnerability.

Mick Jackson's television movie *Temple Grandin* (2010) offers an alternative perspective on intimacy, alienation, and augmented embodiment. It portrays the way that technologies—including technologies repurposed in surprising ways—can extend and reconfigure basic structures of embodiment and, in so doing, *enhance* affectivity and interpersonal intimacy. The movie tells the story of Temple Grandin, a professor of Animal Sciences at Colorado State University, world-leading expert on livestock handling, and author of several books recounting her first-person experience of autism. People with autism like Temple have difficulty coping with the social world. They exhibit a range of different communicative and emotional impairments: difficulty maintaining eye contact and participating in the to-and-fro of interactions, extreme discomfort at being held or touched by others, narrowly circumscribed interests and ritualistic or compulsive behavior, and heightened sensitivity to sounds, textures, smells, light, etc. Temple describes her own childhood as a period where she displayed many of these symptoms: "no speech, poor eye contact, tantrums, appearance of deafness, no interest in people, and constant staring off into space" (Grandin 2006, p.33). As a child, Temple was taken to a neurologist and declared "brain-damaged". Eventually, however, with the support of her mother and the patient mentorship of a high school science teacher, Temple discovered her immense intellectual gifts. But she still struggled to emotionally connect with others.

A crucial step in Temple's entry into the social world was her development of a kind of emotional technology she calls the "squeeze machine" (Grandin 2006, pp. 56-83). Temple modeled her squeeze machine on farm technology: "crushes" used to immobilize livestock while being branded or given veterinary treatment. Livestock crushes consist of a small stall, just long enough for the animal to enter, an entrance gate which can be closed behind the animal, and a "head bail" at the front of the stall

to hold the animal's head in place. A "squeeze crush" like Temple's has an additional feature: its sides can be manually compressed, slowly moving inward until they gently squeeze the animal along the length of its body. This tactile pressure calms the animal and reduces their anxiety by inhibiting perceptual stimulation and movement.

Temple discovered that she, too, could exploit this technology to regulate her own anxiety and unpredictable emotions. One day when Temple was fourteen and staying on her aunt's cattle ranch in Arizona, she instinctively ran into a cattle crush while gripped by a panic attack (she previously bonded with the cattle and would spend a great deal of time with them in their pen). As Jackson portrays this event in his film, Temple's distraught aunt follows Temple as she sprints from the house and lodges herself inside the crush. Understandably, Temple's aunt begs her to get out. But Temple is insistent: she frantically pleads with her aunt to manually compress it. Reluctantly, her aunt does so—and as Temple feels the sides of the crush gradually surround her body, her anxiety dissipates. As she later describes this transformative experience, "For about an hour afterward I felt very calm and serene. My constant anxiety had diminished. *This was the first time I ever felt really comfortable in my own skin*" (Grandin 2006, p.59, my emphasis).

What Temple discovered is that her squeeze machine functions as an external technology replicating human touch—but without the unpredictable elements of face-to-face interaction she finds distressing. She tells us that, "From as far back as I can remember, I always hated to be hugged. I wanted to experience the good feeling of being hugged, but it was too overwhelming. It was like a great, all-engulfing tidal wave of stimulation, and I reacted like a wild animal" (Grandin 2006, p.56). When bodily integrated with the squeeze machine, however, Temple can comfortably regulate the sensory parameters of the encounter.

Emboldened by this discovery, Temple used her engineering genius to build many iterations of her squeeze machine—from a crude, hastily-assembled model comprised of plywood panels and string-controlled pulleys, to a more sophisticated version sporting foam-padded panels and an air-valve lever enabling fine-grained manipulations of pressure. As the sophistication of her technology increased, Temple was able to achieve more significant results. Regular sessions in the squeeze machine throughout the day enabled Temple to better regulate her emotions and reduce her anxiety. They also enhanced Temple's *experience* of embodiment. As her technology became more sophisticated, it afforded deeper forms of integration which, in turn, allowed Temple to explore previously-inaccessible dimensions of her bodily phenomenology. She writes, "In developing many varied, complex ways to operate the squeeze machine on myself, I keep discovering that slight changes in the way I manipulate the control lever affect how it feels...very small variations in the rate and timing…[are] like a language of pressure, and I keep finding new variations with slightly different sensations. For me, this is the tactile equivalent of a complex emotion and this has helped me to understand the complexity of feelings" (Grandin 2006, p.92). Not only did her squeeze machine scaffold the development of greater intimacy with her own embodiment, then. It also enabled Temple use this deepened phenomenological sensitivity to better connect with others on an emotional level. As she puts it, she came to understand that "the pleasurable feelings [elicited by the squeeze machine] were those associated with love for other people…*I would have been as hard as unfeeling as a rock if I had not built my squeeze machine and followed through with its use*" (Grandin 2006, p.85, emphasis mine). Whereas Leonard's augmented embodiment *in Memento* led to a greater sense of bodily self-alienation, Temple's cybernetic practices appear to have had the opposite effect.

In sum, this brief discussion indicates some of the ways that transformative relations between embodiment and technology have been explored in film and television. Apart from their aesthetic value, these on-screen portrayals of posthuman embodiment remind us that to be an embodied subject is to

be always in some way *transcending* that embodiment. As natural born cyborgs, we are most at home

when living in and beyond our skin.

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