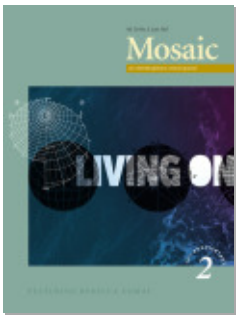
Imitative Identity, Imitative Art, and *AI* : *Artificial Intelligence*



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Recent cognitive scientific and social neuroscientific research into human imitation provides a foundation upon which to base an understanding of the appeal of realistic imitation in general, and realistic visual imitation in particular. This essay uses these ideas in an analysis of Steven Spielberg's 2001 film *AI: Artificial Intelligence.*

Imitative Identity, Imitative Art, and *AI: Artificial Intelligence*

TONY E. JACKSON

Early in Steven Spielberg's *AI: Artificial Intelligence* a stereotypical college professor, Alan Hobby (William Hurt), explains to his admiring research team the historical context of his ambitious next project: "To create an artificial being has been the dream of man since the birth of science," he proclaims: "Not merely the beginning of the modern age, when our forebears astonished the world with the first thinking machines: primitive monsters that could play chess." In the Professor's telling, this still-unfulfilled "dream" accompanied the birth of science, rather than the more recent invention of computers. *AI* deals with what W. J. T. Mitchell refers to as a "biocybernetic" artificial human, one that could only have been invented after the computer (483). But still, the "birth of science" reference places this story as a direct descendent of *Frankenstein*. And with good reason, for that extraordinary novel established the prototype for a wealth of other stories involving manufactured humans. But in fact the Professor's broad generalization about this "dream" is historically

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untrue. We have only to study the history of the Pygmalion myth—in which a perfectly-sculpted imitation woman comes to life—in order to see that humans have long imagined the invention of artificial versions, or imitations, of themselves.

Still, the Professor's over-generalization is very meaningful. If Pygmalion and other stories make clear an ancient and abiding interest in the human creation of a perfect imitation human being, then stories such as *Frankenstein* show that interest having become, at a certain time in history, qualitatively different from what it was before. And a look at more recent stories, such as *AI*, shows that the already-old interest into which Mary Shelley tapped is still present.

We will return to *AI* below. But first, how may we explain the fact of our interest in an imitation human being? We begin by considering imitation more generally. Though imitation as a term has been notoriously contentious, I will be using it in its most common, everyday sense. An imitation is a purposeful creation that looks or sounds like something else that is not an imitation. Here I will be most concerned with what, since at least Plato, has always been the paradigmatic form of imitation: visual likeness. Among all animals, human animals are extraordinarily involved with imitation. We create and enjoy imitations of all kinds, at all ages, in all manner of situations. Given the sheer pervasiveness of imitation we may reasonably infer, as Aristotle did long ago, that imitation is something like an "instinct" in our nature. But if we are to claim that imitation is as primordial as an "instinct," our claim will be all the stronger if we can also explain how and why this would be the case. Where may we turn for such an explanation?

Cognitive science and social neuroscience are two areas of research currently offering powerful answers to this question. Cognitive science is the broad term for the scientific study of the mental processes by which we operate in the human and natural world. Social neuroscience is the broad term for scientific studies of linkages between certain biological mechanisms—"neural, hormonal, cellular, and genetic"—and various forms of social behaviour (Decety and Cacioppo 3). Findings from cognitive science and social neuroscience are helping us come to a new understanding of the nature and significance of imitation in human life.

Humans are, almost from birth, imitative creatures. An influential study by psychologists Andrew Meltzoff and Wolfgang Prinz shows that infants with an average age of just 32 hours imitated facial acts of adults (23). Much research has been conducted on adult imitativeness as well. For instance, social neuroscientists have established the neurobiological bases of empathy: our ability to consciously share the feelings of others (Decety and Ickes; Singer and Decety). And we have similar research on emotional contagion: our strong predisposition to automatically (unconsciously)

imitate the faces, voices, and movements of others, and so to experience vicariously their emotional state. Emotional contagion is, as Elaine Hatfield, Richard L. Rapson, and Yen-Chi L. Le have written, quite enigmatic: "People seem to be capable of mimicking other's facial, vocal, and postural expressions with stunning rapidity," and yet they "seem unaware of how swiftly and how completely they are able to track the expressive behaviors and emotions of others" (26).[1]

This research leads to the conclusion that imitation is, among other things, a constitutive element of human social psychology. Imitation in newborns, Marcel Kinsbourne argues, "becomes the source of most of one's social knowledge base." Further, "imitation begins far too early in development to have originated as a deliberate and reasoned choice. Also, its role is far-reaching, beyond adaptation to the social norm. It is a prime mover in mental development, and [. . .] underlies affiliation both to individuals and to the group [. . .]. Affiliation has a neurobiological rudiment, mediated by imitation" (326). We tend to think of imitation as something we choose to do, but in fact evidence shows that imitation is "a default social behavior [. . .] not something we only occasionally engage in. Instead, we *usually* imitate—automatically—and not doing it is the exception" (Dijksterhuis 208, emph. Dijksterhuis's). "Automatically" here means unconsciously. Our disposition to imitate, then, is an unconscious constituent of our conscious identities.

Further, social-neuroscientific research is discovering that imitation is likely to be a function of our neurobiological nature. In the 1990s, Italian neuroscientists examining the active brains of macaque monkeys discovered that the same set of neurons would fire both when the monkey performed an action and when the monkey observed an other agent perform that same action. The visual perception of the other's action involved not only the expected neural activities in the perceiving monkey's *visual* system, but the firing of neurons in the observer's own motor system. But this latter activation did *not* produce a motor action on the observer's part. In other words, the firing of the motor neurons was only an imitation or a mirroring of the observed action. These neurons became known as "mirror neurons," and "mirror neuron systems" has become the general term for this neuronal activity.

Since the 1990s mirror neuron systems have been studied in humans, leading to claims that the "mirror neuron system is now well established in humans" (Keysers, Thioux, and Gazzola 528). But for good reason such claims are still being debated.[2] The debate matters because of the profound implications that such a system has for human nature. We have established that imitation is an essential element of rudimentary social psychology. In the cognitive sciences the most rudimentary, foundational human psychology is known as our innate "Theory of Mind": our intuitive

knowledge that other human beings have intentional mental states like our own. On the most basic level we don't have to learn Theory of Mind. Mirror neuron systems have been proposed as the biologically-based "interindividual" mechanism that enables Theory of Mind to operate (Semin and Cacioppo 120). This conclusion is supported by the fact that mirror neurons have been shown to activate specifically in response to the observation of goal-oriented actions rather than actions of any random kind. Much of the research has focused on the observation of simple but clearly intentional motions of the hand: reaching for an object, for instance (Sinigaglia and Rizzolatti). Because of neuronal mirroring, it turns out that just in observing others' actions, we automatically, unconsciously register others as intentional beings like ourselves. Theory of Mind is the psychological foundation of the human animal's uniquely social identity, and mirror neuron systems offer a possible biological explanation of how and why Theory of Mind operates as it does.

These claims about neuronal systems are clearly quite significant, but we need to take care with how we use them. Social-neuroscientific research establishes the neurologically-based constituents of certain elements of social behaviour and belief. But it is unlikely that we will discover any one-to-one causal linkages between this kind of biological substrate and social behaviour. At best, it will turn out that, for instance, the mirror neuron system may be one key element in the production of the massively complex nature of social being. With respect to mirror neuron systems in particular, even if they don't turn out to be what they seem now to be, there is a solid consensus that our imitative nature, like our Theory of Mind, is "wired in." As Christos Canos et al. explain, "Although the debate as to whether the human mirror neuron system is a distinct circuit continues, it has become clear that there is a neural network predominantly engaged in action observation/recognition and action execution, including imitation" (1223). Similarly, Rick B. van Baaren et al. write in *The Social Neuroscience of Empathy* that there is "ample evidence for automatic imitation in humans. [. . .] The reason we mimic automatically is that the perception of a certain behavior automatically activates our own motor representation of that action. [. . .] Humans seem wired to imitate, and imitation is the default in the innumerable social interactions we have" (32). So in any case this kind of research enables us to say that human identity is, even on the level of neurobiology, an imitative identity.

Now, why do these understandings of imitative identity matter for the study of, for instance, literature and the arts? They provide a foundation upon which to build interpretations of specific cultural productions. Used this way, social neuroscience operates as do various other interpretive approaches, especially cognitively-oriented approaches, as in the work of Lisa Zunshine, Torben Grodal, Arthur P. Shimamura,

Joseph D. Anderson and Barbara Fisher Anderson, and others. But it also operates as do the more conventional interpretive approaches: from gender theory to cultural materialism to psychoanalysis to postcolonial theory, and so on. We take the grounding ideas about the unconscious constituents of consciousness as valid, and then we use those ideas to explore works of art.

From our social neuroscientific beginning, we may go on to predict that an imitative identity will be unavoidably plagued by certain powerful negative possibilities. Imitation always entails a continuum that runs from dissimilarity on one end to duplication on the opposite end. A creature whose self-identity depends on imitation, again even on the neurological level, must be essentially involved with this continuum. Researchers on the mirror-neuron system and Theory of Mind have taken this into account. Our sense of individual self depends on a systematic differentiation between mirroring motor-neuron activation and the motor-neuron activation that occurs when we will ourselves to act. There must be a mechanism that prevents the automatic mirror-firing from actually becoming an action. Imitation "is inherent in the organization of the central nervous system and may have to be restrained for non-imitative responses to occur. Whereas in intact individuals, inhibitory barriers preclude the overt imitative act, in the developing infant these barriers are yet to be erected" (Kinsbourne 314).[3] This can explain why Meltzoff and Prinz's neonates were automatically imitating at such an early age.

But "mirror-based sharing of action can also account for the reason why in some circumstances the self/other distinction might partly fail" (Sinigaglia and Rizzolatti 70). In other words, an imitative identity is necessarily susceptible to two kinds of systemic failure: over-imitation of others, or under-imitation of others. Over-imitation involves a swing all the way to the duplication end of the continuum of imitation. The system is in a condition of automatic over-imitation and causes unwilled and uncontrollable imitation of another's movements or speech. This results in a number of pathologies, collectively known as "echophenomena" (Canos et al.). In the other direction, autism has been explained, in part, as a systematic inability to imitate others. Neuroscientist V. S. Ramachandran may be the most well-known supporter of this idea. He claims that experimental "results strongly suggest that children with autism have a dysfunctional mirror-neuron system" (152). In this case the system is in a condition of extreme under-mirroring, under-imitation. The self lacks sufficient automatic imitation of the other and so is socially under-connected.

If an imitative identity is necessarily subject to the possibility of these debilitating extremes, then we might further predict that the human animal, also the story-

telling animal, would be fascinated by stories involving certain kinds of under-imitation and over-imitation. This would be much the same as the way in which a gravity-bound creature who walks upright on two precarious legs is fascinated by falling down, literally, fictionally, and metaphorically (as in the Fall). In the present case I want to concentrate on over-imitation.

Our fascination with stories of over-imitation is plain enough, as witness the long traditions of twins stories and, more recently, doppelganger stories.[4] Equally revealing though not so obvious is the history of realistic imitation in the arts. We may trace a lineage—with stops and starts along the way—of attempts to create visual imitations that look as much like the real as possible, climaxing in some ways with cinema. As Margaret A. Hagen has written, the history of much of Western art "can be seen to a great extent as an advance toward photographic realism," and therefore "any stylistic change in the photographic direction necessarily would produce an impression of realism, to the extent that photographic fidelity provides the criterion of realism" (81). André Bazin famously argued that the invention of film finally enabled painting to give up its ancient quest to imitate the visible real: "Photography and the cinema," he writes, "are discoveries that satisfy, once and for all and in its very essence, our obsession with realism" (12). Bazin was right about the specific historical relationship between cinema and painting. He's also right about our obsession with realism. But strictly speaking an obsession can't be satisfied.

I have been speaking of fascination. What does it mean to be fascinated by realistic visual imitations? To be fascinated is to be ambivalent, to feel at once both pleasure—the usual satisfaction of our "instinct" for imitation—and a kind of fear or anxiety or mistrust. In this case the more realistic an imitation, the less possible it is to distinguish the imitation from its original. Ultimately, we run the risk of being fooled, of (mis)believing that the imitation is the real thing. If we consider humans as evolved creatures, we must assume in general "that beliefs that maximise the survival of the believer will be those that best approximate reality," and therefore that we "have been biologically engineered to form true beliefs—by evolution" (McKay and Dennett 493).

But of course misbeliefs are common in human affairs. Attending to a realistic imitation does not typically involve misbelief, except perhaps in very young children. We typically know that we are seeing an imitation. But the drive toward ever more realistic imitation reveals a desire to come as close as possible to being fooled into what, if it were not willfully produced, would be a fundamentally dangerous state of mind: misbelief, or false knowledge. We well know how dangerous such misbelief can be. Sometimes we use lures, decoys, or other imitations to give ourselves a lethal advantage over others. This negative awareness is, in part, why realistic imitations are fascinating.

The situation compares, again, to the way we two-legged creatures will at least *want* to look right over a precipice. Some of us will get as close to the edge as possible. And some of us—tightrope walkers—will take this fascination with falling to a maximum. Many, if not most of us, enjoy watching a tight-rope walker, and part of our enjoyment is tied up with the very real risk that the performer will fall. The general fascination with falling constantly takes up any new means of testing itself: from circus trapeze to parachute-jumping to bungee-jumping. In a similar way the pleasure of realistic imitations involves the risk of misbelief. It's as if we feel some recurring need to test our ability to know veridical belief from misbelief, the real from the imitation. The history of realistic imitation, then, can be read as a continual need to upgrade the test as various new means of imitation get invented.

With this enigmatic appeal established—we enjoy realistic imitations in part because we run the risk of misbelief—let's now consider in more detail the cognitive nature of our experience of, specifically, imitative visual art. Our fascination with over-imitation always involves what I will call disjunctive cognition. Put simply, our eyes see one thing, but our mind knows another thing. I use the term *disjunctive cognition* instead of the most likely other possibility, *illusion*. This is because we can experience an illusion without knowing it—thus the usage "to be under the illusion that." But with respect to realistic imitations we know when we're experiencing a disjunctive cognition.

When a disjunctive cognitive experience occurs in everyday life, as with a mirage, we typically work to straighten it out: to square what we see with what we know. But, curiously, human beings have always created disjunctive cognitive experiences as forms of entertainment. In special places and times we enjoy undergoing a disjunction between what we see and what we know. Stage magic may be the most ready example of this. But the same appeal underlies, cognitively speaking, our enjoyment of realistic visual imitation in general. Very often, the stronger the disjunction, which is to say the more realistic the imitation, the more enjoyable the experience. Again, we like to come as close as possible to being fooled into what, if it were not willfully produced, would be a fundamentally dangerous experience: misperception.

This returns us to *Frankenstein* and *AI*. If the imitative animal is fascinated by realistic imitations in general, and by over-imitation in general, then that fascination surely reaches a maximum with the creation of imitation human beings. Apart from the ancient history of the sculpted human form, wax works and animatronics are perhaps the most obvious, modern, everyday proof of this.[5] A realistic imitation of a human being pushes the negative possibility of over-imitation—being fooled into misbelief, misperceiving the real—to a disquieting extreme. For many reasons, some

wise, some foolish, we humans take it for granted that we are a special entity in the world, unique as a species. What happens to our sense of unique being if we can create a perfect imitation in our own image; not just a perfect waxwork, but a moving, talking imitation that is indistinguishable from ourselves? I stress that our experience of such an entity is not most accurately described as what Zunshine calls "cognitive uncertainty" (54). We're not unsure of what we see. Our eyes directly and clearly see a material human being, and yet we know that it is an imitation. What becomes of our own unique being if we can create an imitation human so like us that our senses can't register it as an imitation? This is a profound threat, not just on the level of psychology, but on the level of ontology: a threat to the status of our being as entities in the world. And yet we seem *compelled* to imagine—we are fascinated by—just this possibility.

To be more precise, this compulsion shows up only in modernity. As mentioned above, the ancient interest in imitation human beings becomes vastly amplified with the simultaneous emergence of modern science and industrial mass production in modernity: the "improvements [. . .] in science and mechanics," as Frankenstein says (33). Before these historical forces came on the scene, all imaginations of imitation humans required some kind of supernatural cause. There was basically one kind of story to tell. When the progress of science, technology, and industry makes the invention of a human being at least a possible material reality, we have a constant supply of new stories because technology constantly changes. The old supernatural fantasies get translated into *Frankenstein*. And we never fail to generate new stories of this kind as any new means of inventing human beings become possible. The old interest becomes a compulsion.

With our social-neuroscientific understandings of imitative identity and its relationships to imitative art in mind, we now turn to Spielberg's *AI*. In a movie about a "perfect" imitation human, we have an overloaded sample text. We will consider just a few key elements.

The story involves the first test-run of the latest model of android, or mecha, as they are called here. The Professor's opening speech shows how we are both deeply interested in and deeply wary of our interest in an imitation human. The Professor readily admits that much progress toward the old "dream" has already been made. In fact, he says that mechas now are a "perfect simulacrum" of the human. But to mention this fact immediately requires a utilitarian justification. The "artificial being has reached its highest form," he says: "Universally adopted mecha, the basis for hundreds of models, serving the human race in all the multiplicity of daily life." To imagine a perfect imitation human is to be immersed in profound issues of "use." The mecha is in one way simply another invention. Typically, we invent things either for some kind

of entertainment or for some instrumental use. Though we might invent imitation humans for entertainment—Disney-style animatronics is already this—the closer the imitation human gets to its original, the less possible it is to think of in terms of either entertainment or instrumental use. For although we know the imitation is only a machine, a kind of object, nonetheless our senses detect a human; and we take it as wrong to use humans as machines or objects. The more like a human it is, the less we'll *feel* right about "using" it as a machine at all. I stress feeling because, in Minsoo Kang's words, our response is "visceral" (28). We know rationally that the issue of use in this case is no different from the issue of using a car or a hammer.

The Professor must immediately mention utility because if the imitation human is not invented for its practical use, then a host of very difficult questions arise. What is its status as an entity? Is it a work of art? If not that, then what? How would we categorize it, or even identify it as an entity? What kinds of legal, moral, sexual, ethical, and other responsibilities would apply to such an entity? No responsibilities? The same as our own responsibilities? Other truly unsettling issues would also accompany such an invention. No matter what else it may be, an imitation human will necessarily present uniquely difficult problems. If we have some clear practical and profitable use for the imitation, that will help us ignore those problems. But still, to imagine such an entity at all is, for the imitative identity, automatically a kind of very anxious self-investigation. And yet clearly we are compelled to keep going. We don't like to think of ourselves as subject to such a mindless compulsion, so we generate ways to camouflage it. Practical use is one way. Describing the compulsion as glorious scientific "dream" is another.

Having stated outright that the "perfect simulacrum" already exists, the Professor then contradicts himself. So far, though mechas are wired to respond to physical pain, they cannot produce or respond to emotions; they can't experience love, and therefore can't be perfect. A current mecha, named Sheila (Sabrina Grdevich), is present in this scene. The Professor uses her to show the mecha's inability to experience feelings apart from basic pain response. An imitation human being that cannot experience emotions is, the Professor says dismissively, merely a "sensory toy."

The next mecha, though, will be perfect because it will experience love. And it will be useful. In this future world an eco-apocalypse has required the restriction and licensing of pregnancies, which means childlessness is common: "With all the childless couples yearning in vain for a license," the Professor says, "our little mecha [. . .] will fill a great human need." Once again *Frankenstein* establishes the paradigm. Victor Frankenstein sets out, so he believes, with the noble but practical desire to overcome the forces of death that had stolen away his mother. This goal justifies the "horrors of

[his] secret toil." But soon he is entirely taken over by the "resistless, and almost frantic" compulsion to create a living human being, no matter any possible use or consequences (33). Professor Hobby may not be frantic in the way of Victor Frankenstein, but the desire to construct an imitation human remains irresistible, in spite of the many profoundly negative possibilities.

The Professor's opening speech captures in miniature the way in which the compulsion to build an ever more human-like imitation evolves. The current mechas have been occupying the point on the imitation-continuum that is historically nearest to being identical with human beings. That's why they have been "perfect." And their invention has been justified by their uses in everyday life. But the compulsion (the fascination) always insists on maximizing the technological possibilities, using whatever is available in order to produce the most realistic imitation human possible. As this story begins, a next step has become technologically possible: a mecha who can love. Accordingly, the current "highest achievement" gets relegated to the category of "toys." And as with the invocation of the "dream," the dubious notion of love as "useful" serves to conceal the underlying compulsion to create a perfect human imitation.

One of the Professor's team members does bring up the one "moral question" that the film will directly consider. "If a robot could genuinely love a person," she asks, "what responsibility does that person hold toward that mecha in return?" That question, he replies, is the "oldest one of all. But in the beginning didn't God create Adam to love him?" At the moment of being confronted with the one direct, difficult question, the Professor refuses to answer and turns instead to the comfort of a religious creation myth. The film as a whole will do much the same.

The use of a child mecha makes this film relevant to the imitative identity in specific ways. Right away, when we first meet twelve-year-old David (Haley Osment), the cinematography directly foregrounds the experience of disjunctive visual cognition. David's "father," Henry (Sam Robards), brings David home as a surprise to meet his "mother," Monica (Frances O'Connor). The setting is the family living room. The camera is at floor level, with both Monica and Henry in the shot. Both are looking expectantly toward the front door, everything in focus. Though Monica doesn't know that Henry has brought home a mecha, the viewer does know this, easily inferring it from the previous scene. Instead of maintaining this initial family-inclusive shot as the door opens, we see a cut to an out-of-focus medium shot of just the door. It slides open, revealing a very blurry, dark figure against white backlighting. It doesn't quite make sense within this otherwise quite crisp, clear world that a figure only fifteen feet away would be out of focus. But in any case our seeing and our knowing automatically work together in the normal way with this sight. In spite of very limited visual information,

we immediately recognize a human figure, and we immediately want and expect to see that figure more clearly. A cut back to Monica shows her peering uncertainly at the doorway as if she can't make out what's there, even though it's right in front of her. This evidently means that she sees the figure out of focus just as we do, which also doesn't make sense within this world. The implication is that, with an entity such as David, seeing and knowing simply will not be occurring in the usual way.

A few seconds later we cut to a medium rear shot of David, who turns toward the camera. Now a spatial event has occurred that doesn't make perceptual sense. Everything is perfectly clear to the eye, but David is suddenly standing approximately where Monica had just been standing, though no one except David was moving in the previous shot, and he was still on the carpet in front of the door. Now he is blocked just left of centre, where Monica had been blocked just right of centre. We clearly see behind David what was clearly behind Monica just before: some glass doors to a balcony that looks out on a green outdoor space. This is not an example of a jump cut. From within this fictional world there can be no explanation of this magical movement. Within the story there is not even any acknowledgement that it has happened. But for the viewer, what we see is in direct conflict with what we know. In this way, visual cognition itself becomes an issue. This particular character is now directly associated with the idea of visuo-cognitive disjunction, not just on the level of thematic content, but on the level of visual experience.

We next see David as his parents are secretly watching him. They are awestruck, dumbfounded by the disjunction between what their eyes see—a real boy—and what they know: that he is a mecha. Significantly, David, unaware of being watched, is studying a collection of family photographs. We can tell from his expression that he is awestruck at seeing for the first time these two-dimensional images that look exactly like the real people around him. In fact he is as amazed by the photographs as his parents are of him. David's fascination expresses what many of us may well have long since forgotten: photography was and still remains an epochal revolution in the production of visual, specifically realistic visual, images. In this way the film links David directly to photography and therefore to the history of mechanically-produced imitation, and therefore to the imitative identity's fascination with realism. David is the latest entry in that history.

The first family gathering, at dinner the next evening, installs the original operation of imitative identity directly into the story. Being a mecha, David has no need of human basics such as food or sleep. Nonetheless he sits at the table. He begins to mimic his parents' motions, pretending to drink like his father, and then to fork and spoon-roll pasta noodles like his mother. With this first image of a direct act of imi-

tation, the film brings into play both the foundational neuronal and infantile imitative events. David first mimics the most rudimentary, goal-oriented hand motions, much the same kinds of motions used experimentally to study the activity of the mirror neuron system. And we see an operating example of the newborn's rudimentary imitation of its caregiver, as established by the Meltzoff and Prinz studies. Unlike an infant, David is imitating consciously rather than automatically. The effect is that he feels compelled to make up for what he did not get as a real human child.

Monica doesn't know how to react. In the normal scenario, both mother and baby imitate each other spontaneously and constantly. But David has arrived as a twelve-year-old imitation, so the usual rules don't apply. When Monica doesn't quite get a noodle all the way into her mouth, David bursts out into loud but obviously false laughter. He evidently understands humour but he can only imperfectly imitate the vocal means by which we respond to something funny. In spite of themselves, both parents begin to chuckle. As David laughs harder still, they both have to do the same and so, almost certainly, does the viewer. The scene taps into what we all know: laughter, like yawning, is contagious. We regularly respond to another's laughter with our own laughter, and do so apart from our conscious will. This, too, is a most rudimentary element of imitative identity, a point made all the stronger because the two adults can't help but laugh even though the laughter of their mecha son sounds, as in fact it is, artificial.

Our social-neuroscientific understanding of imitative identity has given us a means by which to analyze these early elements of the film. The first scenes of the new family make plain that the film, whatever else it may come to be about, will certainly be an entry in the list of the imitative animal's self-investigations. *AI* is especially rich in this way. David is constructed to be a child to his parents, but he comes with an optional program, turned on by an irreversible switch, that will cause him to love his parents. Monica is the one who throws the switch, and as a result his love for his "mommy" becomes the core of the first part of the film. The middle portion of the story presents a series of other mechas through which, by contrast, we may better grasp David's "perfection." And it also presents other possible responses to the perfect imitation human, the most spectacular of which occurs in the Flesh Fair sequence. David Sterritt aptly calls this a "lurid carnival" that exposes "in ferocious and frightening terms the raging hostility directed by orgas [human beings] at the mechas who share their world" (57). But in fact, since mechas are merely machines, even this hostility turns out to be a way of dodging the underlying fact: that humans seem compelled to produce a perfect human imitation. Rather than act or even speak against the real problem, the producers of mechas, the crowd spends all its energy pointlessly destroying the products.

In the interests of space, we turn from the middle to a detailed consideration of the ending. How does this particular instantiation of the ancient interest in imitation human beings manage to conclude? We have seen that the "use" issue is unavoidable when we imagine an imitation human being. Within the world of the story, the question is: what is to be done with such an entity? But in this case, *AI* as a story has the same problem as the people within its fictional world. What, finally, is to be done with this perfect imitation? Well, of course David isn't truly a perfect imitation. If he were, he wouldn't be story-worthy. David's "love" for his mommy is perfect in one way. He is every parent's "dream" of a perfectly loving little boy. But of course this "ignores the fact that the human object of David's affection," who is not perfect, "is destined to be incapable of loving a robot unconditionally and will die long before the robot wears down, leaving David alone and fractured for eternity" (Flannery-Dailey 11). He cannot change, while everyone and everything around him will constantly change. He is programmed to be satisfied with exactly one pure, static version of love from exactly one person in the world. In a human being his "love" would be a debilitating mental illness, a mindless obsession.

Apart from this, David's remaining machine nature causes him to be, at times, an unintentional danger to the family. Though David fulfills his function as an imitation son up to a point, in the end Monica and her husband decide that he cannot stay in the family. They had earlier signed an agreement whereby David would be returned to the factory if he didn't work out. But Monica knows he will be dismantled or "killed" there. She thinks of David as real enough not to sentence him to "death," but she will do with him what she would not do with a real son: abandon him in a forest. He is traumatized. The second half of the film follows him on a distinctly fairy-tale journey to become a "real" boy so that his mommy will love him after all.

He is accompanied on his journey by a mecha sidekick, Gigolo Joe (Jude Law). Joe appears as the one character in the film who speaks the key truth about the perfect imitation human. "Your mommy," Joe tells David, "cannot love you. You are neither flesh nor blood. You are not a dog or a cat or a canary. You were designed and built specific like the rest of us." In this way the film admits that artificial, imitation, instrumental love, no matter how much like the real thing, cannot induce a real reciprocal human love. A certain relief follows for the imitative identity: human singularity is preserved after all. But even though the film admits this outright, it still does not treat David as what he is: a machine.

David cannot possibly get what he is built to want: love from his human mommy. Since he's an extremely well-made machine, he doesn't break down, ever. Spielberg, like Monica, cannot send David to his destruction. In order to bring closure to a tale

with this kind of protagonist we get an elaborate and rather literal *deus ex machina* ending. After a series of adventures, David becomes trapped in a Coney-Island style amusement park that has been covered over by a post-apocalyptic ocean. That ocean freezes. Humans disappear, but their machines live on, even evolving into what are called "supermechas."

After two thousand years a team of supermechas who are excavating the ruins of ancient human Earth discover frozen David, still functional, still absolutely driven to become real and to have the love of his mommy. The supermechas cannot make a real boy of the imitation boy but they are god-like machines in their own way. They can create a kind of imitation mommy. From DNA traces they resurrect—or clone—Monica, though in true fairy-tale style, only for one day. She has Monica's own memories and consciousness, to a degree. She can't simply be Monica again because she would be utterly traumatized. So in fact she's an imitation mommy, a perfected mommy, a "dream-mommy." She has only the knowledge and awareness she needs in order to return David's precise "love," no questions asked.

Here at the very end, then, the film brings in a version of the other great early twenty-first-century technological means of creating a human: cloning. At the same time that this possibility gets plugged in at the end of the film, its implications are also avoided. Though this mommy will be constructed from the real mommy's DNA, no real mommy still exists to force the issue of what it would mean to have a biologically-duplicate being in the world. After a perfect day of games like hide and seek, the dream son and the dream mommy fall asleep together. The end.

We have a number of negative implications and ambiguities here—Frances Flannery-Dailey explains nine possible readings of the ending—but nonetheless it's hard not to see this conclusion as a "sickeningly sweet fantasy of mother-son bliss" (Mitchell 482). After setting off to boldly explore the implications of an imitation human being that can love, *AI* concludes with a full-scale fairy-tale retreat. In the end, over-imitation is simply no longer a problem because there are no humans around. Now, for a creature fascinated by over-imitation, this is a monumentally negative possibility: the imitation (supermechas) literally takes the place of the original. Ironically, it turns out that the folks at the Flesh Fair were right to fear mechas. In *AI* just this ending scenario is both crucial to the plot and entirely glossed over. The apocalyptic disappearance of the real humans is never explained, hardly mentioned. It has simply happened in the intervening two thousand years. The supermechas have taken the place of humans, but it's OK. They are kindly and benevolent; and to make things all the better, they're nostalgic for the real humans that David was lucky enough to know in the flesh. They have no ontological problems at all with a "perfect" imitation human.

All stories that focus on imitation humans will be a version of self-investigation by the imitative identity. Our social-neuroscientific understanding of imitative identity provides a means of explaining the specifics of a given version. In the case of *AI* we have seen how the compulsion to create the perfect imitation must be followed, and how new stories get told as new technological possibilities emerge. We have also seen how the ontological implications of such an imitation can be brought forward but also quarantined, camouflaged. In this way the movie as a whole rather perfectly demonstrates our fascination with the perfect imitation human being. In *AI* the imitative identity explores another version of the perfect imitation human, but also safely tucks it away in a fairy tale.

NOTES

1/ See also Marco Iacoboni.

2/ See for example Gregory Hickok; and Luca Turella, Andrea C. Pierno, Federico Tubaldi, and Umberto Castiello.

3/ See also Marc Jeannerod (112).

4/ For another, related explanation of this, see Zunshine.

5/ But as Masahiro K. Mori originally explained in his idea of the "uncanny valley," we find imitation humans fascinating only up to a certain point of similarity, and then beyond that point we feel a gut-level instinctive sense of unease or aversion. Then beyond a still further point, we respond positively, or at least not negatively, again.

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