Soft Robotic Incarnation

# Introduction

# Phenomenology of Incarnation

## Stranger Fetishism and the Circulation of Emotions

We begin with further investigation of the conditions that led to the above event of incarnation. As noted, prior to the encounter, I had nothing but an image of a Palestinian; the so called *Other*. An image that was fed by media, by conversations, by my own internal processes, none of which originated directly by a Palestinian, co-inhabiting my own time and space. I have developed a milieu of emotions toward that image; emotions that were by definition generalized and prejudiced, since they were oriented toward an abstract entity. Moreover, these emotions tended to be posited on more extreme ends of the emotional spectrum, either being strongly negative or strongly positive.

This phenomenon is symptomatic to what is described by Sara Ahmed as “Stranger Fetishism”. In her book *Strange encounters*, she defines it as “a fetishism of figures: it invests the figure of the stranger with a life of its own insofar as it cuts ‘the stranger’ off from the histories of its determination.” (Ahmed, 2000, p. 5). The epistemological gap of the stranger in its corporeality leaves an opening for an over-representation; a figure of our imagination that we endow with deep emotional value. Ahmed borrows the term “fetishism”, both from a Marxist perspective of “commodity fetishism” and from a Freudian perspective of a phantasmic substitution.

Let us first examine the Marxist perspective. In *Capital: Vol I*, Marx explains his notion of commodity fetishism (Marx, 2015, p. 47). The fetishism lies in the Bourgeois’s inability to discriminate between the commodity item’s inherent and physical history, such as labor time, materiality and use, and its abstract value that is determined by the social relations of exchange: “A commodity is therefore a mysterious thing, simply because in it the social character of men’s labour appears to them as an objective character stamped upon the product of that labour” (Marx, 2015, p. 47). When we assign a monetary value to a certain item, we in fact conceal the fact that this value is a result of a social and historical process and it appears as if the value is an objective property of that item. The concept of commodity fetishism was later expanded by Georg Lukács to the term *reification* (1971, p. 83): a general phenomenon that gradually sinks into human consciousness in which all spiritual and immaterial relations become atomized and quantified as things. Ahmed juxtaposes reification with the fetishization of the figure of the stranger. In this case, the ‘commodity object’ that is tied to a material basis would be a corporeal person of some social identity, while the immaterial value that we assign to it is the abstract figure of the stranger, containing all prejudice and bias.

The analogy becomes even more compelling when we examine the economical circulation of emotions that are associated with the stranger. In her later book, *Cultural Politics of Emotion*, Ahmed identifies a relation between the circulation of abstract monetary value during commerce and the circulation of affect involving strangers in society (Ahmed, 2014, p. 45). In his discussion about the general formula of capital (Marx, 2015, p. 104), Marx explains the importance of the transition from the more simple form of trade: Commodity-Money-Commodity (C-M-C), to the more modern form of Money-Commodity-Money (M-C-M). In the former, more simple form, money is used only as an abstract mediator between two objects that are grounded in their materiality and use-value. For example one would sell their produced crop of corn to obtain money, which would then be used to buy cloths. However, in the latter form of M-C-M, the accumulation of abstract value is the end goal of the transaction, and since the only use of the money is to further accrue it, the process is endless. Thus, value, or circulated capital “suddenly presents itself as an independent substance, endowed with a motion of its own, passing through a life-substance of its own, in which money and commodities are mere forms forms which it assumes and casts off in turn” (Marx, 2015, p. 107). The same effect, Ahmed suggests, occurs when the imaginative figure of the stranger and its associated emotions are circulated throughout society. Ahmed provides as an example the discourse surrounding asylum seekers in the UK. Leaders of the conservative party have created a frightening image of the asylum seeker, one that is not only “flooding” and “swamping” the nation, but is also disingenuous in their intention; faking the need for asylum in order to be able to reside in the country. This discourse is passed around, from speech to speech, from media report to office conversations, all while breathing life into the imaginative figure and accumulating affect, intensifying the associated negative emotions. The reason for this intensification is exactly that which enables the accumulation of capital; its disassociation with anything physical that can set its bounds. According to Ahmed “The impossibility of reducing hate to a particular body allows hate to circulate in an economic sense, working to differentiate some others from other others, a differentiation that is never ‘over’, as it awaits others who have not yet arrived. Such a discourse of ‘waiting for the bogus’ is what justifies the repetition of violence against the bodies of others in the name of protecting the nation” (Ahmed, 2014, p. 47). She notes that her analogy to Marx is limited, since her “argument does not respect the important Marxian distinction between use value and exchange value” (Ahmed, 2014, p. 45)“, yet it is imperative to recognize the metaphysical similarity between the two notions of circulation. In both, a lack of access to the worldly *flesh* of things, whether they are a stranger or a commodity, drives the emergence of an abstract image. The circulation of the image in society only intensifies its perceived reality, and the powers the projection of strong emotions toward that image.Once an individual of the targeted group, let us say a Muslim asylum seeker, is encountered, whether through media or in person, an event occurs which Ahmed refers to as”the ‘sticking’ of signs to bodies" (Ahmed, 2014, p. 13). The accumulated imaginary value that was intensified by circulation *sticks* to the body of the stranger and appears as if it is an inherent quality of that body.

The discussion on projection and stickiness leads us to the Freudian view of fetishism. Ahmed suggests that the “process of fetishisation involves, not only the displacement of social relations onto an object, but the transformation of fantasies into figures” (Ahmed, 2000, p. 5), she slightly backtracks in the corresponding footnote (Ahmed, 2000, p. 182), arguing that the Freudian model is less suitable, since it privileges the phallus (or lack thereof in women), as that which is being concealed and substituted by the fetishized object. It is however important to note that in Freud’s account for fetishism, it is described as “habitually present in normal love, especially in those stages of it in which the normal sexual aim seems unattainable or its fulfilment prevented” (Freud, 1953, p. 154). Once more is the tendency to ascribe emotional value to an object, as a substitution for a physical state that is non-accessible. We can observe a similar notion at the other end of the emotional spectrum when dealing with the “uncanny”. The term was first explored psychologically by Ernst Jentsch (**???**), defined as an uneasy feeling of “psychical uncertainty” (**???**) that arises when something unknown and foreign is encountered in correlation to something old and familiar, for example when we are uncertain if a certain character is a human person or an automaton. Freud expanded on that notion, claiming that the “uncanny is in reality nothing new or alien, but something which is familiar and old-established in the mind and which has become alienated from it only through the process of repression”, citing examples of repressed phenomena such as “animism, magic and sorcery, the omnipotence of thoughts, man’s attitude to death, involuntary repetition and the castration complex” (Freud, 1955, pp. 241–242). Nevertheless, there is a resemblance between the uncanny and fetishism. In both cases, a certain inaccessibility to the true nature of an object, a certain gap, serves as an incubator for repressed desires or fears toward that object. The conviction that positive and negative emotions are in many occasions interchangeable is also supported by Ahmed (2014, p. 50). She defines hate as a form of intimacy that is in fact predicated by love, citing Gordon W. Allport’s classic account *The Nature of Prejudice*: “a symbiosis and a loving relation always precede hate. There can, in fact, be no hatred until there has been long-continued frustration and disappointment” (Allport, 1954, p. 215). This is all the more supported by neuropsychological studies such as one performed by Zeki and Romaya (2008), showing that hate and love share overlapping neuropsychological mechanisms.

Whether it is fear, love, hate or any other emotion, the impossibility of truly knowing a subject may lead to figure abstraction and ultimately to fetishisation: an emotionally attached relation between us and an imaginative figure. Such a relation, as any highly emotional attachment, is prone to addiction and obsessiveness. Moreover, as we’ve seen, the figure can gain a life of its own and intensify once it takes part in social circulation. Surly, this effect is not simply triggered on any subject that is only partially known; it requires a starting point, an initial value, a birth of a figure. It could be a reported incident involving an asylum seeker, or a mysterious encounter with an attractive individual. If out relation to the abstract figure would remain in the transcendent realm, it wouldn’t have been a major cause for concern, but the relation is naturally cast back into a living subject, resulting in peculiar behavior at best and violence at worst. It remains to be asked, how does one “truly” know a subject? How do we “unfetishise” the stranger? As Marx’s example suggests, there may exist a pivotal role to physicality, to corporeality. Thinking about today’s virtual and digital methods of social interaction, how does a typical WhatsApp conversation contribute to social relations? It is well agreed upon (TODO: **REF**), that indications of the users’ status such as “typing” or “seen message”, create mystery and thus only incubate the fetishized figure, not to mention more enigmatic ways of knowing individuals such as through their social feeds. Yet it seems that even a direct Skype conversation is somewhat lacking (TODO: REF?). The exact cause is elusive, and perhaps only manifests unconsciously, but a virtual encounter always leaves some room for interpretations regarding individuals and our relation to them. Is it body language that we are missing? Some nuance of speech that is not transmitted accurately over the fiber optic cables? Or is it something even more fundamental? To illuminate the significance of the intercorporeal interaction, we turn to the phenomenology of Maurice Merleau-Ponty.

## Flesh and Intercorporeality

How is the physical different from the virtual? How is the real different from the imaginary? These kind of questions quickly evolve into the most fundamental questions of *being* and Consciousness. Queries that have troubled man-kind in both east and west since the beginning of history. However, we are not simply looking for any perspective on the meaning of life and existence; we are looking for one that bestows special status to the physicality and embodiment of the human connection. One that investigates into the corporeality of the *Other* as a medium and a foundation of affect and knowledge, that incorporates the *Other* into *Being*. There is no better place to look than the phenomenology of Maurice Merleau-Ponty.

Phenomenology is a discipline of philosophy that is firstly attributed to Edmund Husserl, but spans a wide range of thinkers and methods (Smith, 2018). Husserl defines it as a “science of essence”, pertaining to the a priori intuitions of consciousness and experience (Husserl, 1982, p. XXII). The discipline of phenomenology can be seen as a historical development which stems from the intuitions of the greatest thinkers of western philosophy such as Descartes and Kant; the intuition that if we are to know anything about the world, it has to start with our conscious experience and its intuitive structures. Merleau-Ponty joins this project with his most widely acclaimed work *Phenomenology of Perception* (Merleau-Ponty, 2013 ). In this work he reminds us that any pure conscious experience is nevertheless an act of the body, that perception is a bi-directional interaction of our body with the world, inhabiting time and space. This implies that “learning”, and even “thinking” are all intentional bodily actions upon the world, and should be investigated as such. According to Merleau-Ponty, insofar as we develop as a body, the range of possibilities is gradually “sedimented” into our physiology, and we become habituated, adjusted to the world that surrounds us. This is not a solipsistic act, since we always co-develop our social identity in concordance with other inhabitants of the world. Despite being written in the 1940s, this approach is relevant today even in regards to modern neuroscience, especially to researchers that inspect the brain as a self-organized non-linear dynamic system that dissipates into the open environment. One of those researches was Walter J. Freeman, a scientist of *Neurodynamics*. In his book *How Brains Make Up their Mind*, Freeman argued that the brain operates as a self-organized complex system of nerve cells, that is arranging its “attractor landscape” in concordance with the outside world. Input from the outside environment triggers this dynamic system into a trajectory of patterns that determines our behavior. Freeman cites Merleau-Ponty numerous times, asserting his intuition of bodily perception and assimilation of the world’s structures. (Freeman, 2000, pp. 125–127). An even more radical scientific manifestation of Merleau-Ponty’s theories can be found in theories of *Quantum Neurodynamics*, that portray the brain as a dissipative quantum field that melds with the external world. Quantum neuroscience researcher Giuseppe Vitiello refers to the “openness of the brain to the external world” as dissipation (Vitiello, 2007); Merleau-Ponty uses very similar phrasings in his theories, maintaining his focus on the entire body, rather than just the brain. Such thought is linked to even more modern theories, for example regarding the roles that gut microbes play in shaping our behavior (Dinan, Stilling, Stanton, & Cryan, 2015). The intuitive investigations of Merleau-Ponty are proven to be scientifically sound even decades after they were written. (TODO: Write about Enactivism).

In final published works of Merleau-Ponty: *The visible and the Invisible* (1968), a work that is incomplete due to his untimely death at the age of 53 and was published posthumously, and *Eye and Mind* (1964, p. 159), an essay about aesthetics and metaphysics, Merleau-Ponty starts laying down his own ontology - the ontology of *flesh*. He critiques previous ontological interrogations of existence and begins to divulges his own theory, placing a great emphasis on how our relationship with the *Other* is crucial to our understanding of metaphysics; after-all, it is the basis for our existence as social beings. The underlying question, however, is still one of *knowing*. What exists? What is true? How do we make the logical leap from being immersed in a vivid experience of life, to devising positive facts about our world, ourselves and others? Merleau is critical of “philosophies of reflection”, primarily referring to those of Descartes and Kant that could be considered as forms of Idealism. The proverbial *Cogito* - “I think there for I am”, intuitively shifts our attention to the world of *thought*. We cannot directly know and access the world outside of our body, except through the mediator of thought. Through reflection and logical analysis, we deduce whether our experience is that of perceiving the real outside world, or that of imagining. By examining the consistency of change in our inner world, in relation to our actions and our body, we assert the geometrical rules of the world. Our interaction with the world is passive; we consume light that is coming from things, and organize it according to our logical structures. What does that suggest regarding our relation to others? “If then the others are thoughts, as such they are not behind their body which I see — they are, like myself, nowhere; they are, like myself, coextensive with being, and there is no problem of incarnation”. Reflection is thus “the simple transposition of the incarnate subject into a transcendental subject and of the reality of the world into an ideality” (Merleau-Ponty et al., 1968, p. 31). Hence, intuitively we disregard the others in their physicality: “there is no intermundane space, there is only a signification ‘world’” (Merleau-Ponty et al., 1968, p. 53). In *Eye and Mind* Merleau-Ponty argues that painting is the ultimate manifestation of *Being* in all its depth. A Cartesian view of vision however, is insufficient in its understanding of the world around us: “A Cartesian does not see himself in the mirror; he sees a dummy, an ‘outside,’ which, he has every reason to believe, other people see in the very same way but which, no more for himself than for others, is not a body in the flesh.” (1964, p. 170). From these writings it is clear that this form of idealism is perilous, because it encourages the reduction of individuals to thoughts, of actions to signs and of bodies to images. Such a view may lead Sarah Ahmed’s notion of fetishisation of the *Other*.

Idealism has another fundamental flaw in its logic, and that is its circularity - the fact that the rules of perception and the relation between subject and object, are defined using the same logical constructs that they induce. How could we formulate the relation between ideas and things, when all we have is our pure experience that has no inherent logic of subject and object? What is the primal a priori basis for the notion of space? Who is the circumscribed “I” that thinks therefore it exists? These logical loops sprouted other philosophies of experience, such as *Being and Nothingness*, the title of Jean Paul Sartre’s essay on ontology (Sartre, 2012). Sartre recognizes that our subjective experience is in fact all there is, this *Being* that we endure encompasses everything and leaves no room for a subject or object. What then remains to our subjectivity is merely a vessel for *Being* - a *Nothing*, a negation of everything. We are solely a “a fissure that deepens in the exact measure that it is filled” (Merleau-Ponty et al., 1968, p. 53). Sartre states that “man is the being through whom nothingness comes to the world” (Sartre, 2012, p. 24), referring in fact to our freedom of choice. The ability of the human consciousness to create a distance from the totality of *Being*, to “secrete a nothingness which isolates it” (Sartre, 2012, p. 24) and to act for itself, is Sartre’s idea of freedom. Nevertheless, Merleau-Ponty reminds us that our concrete body, our thoughts, our subjectiveness, those are all still parts of a *Being* that lies at a close distance to the nullified self. Where, then, is the place of the *Other* in such *Being*? It is clear that if *Being* is everything, then my body and situation share the same *Being* as the *Other*’s body and situation, an intermundane space is emerging. But more than a cooperation, the interaction with the *Other* is a vortex that drains into my nothingness: “The experience of the other’s gaze upon me only prolongs my inward conviction of being nothing, of living only as a parasite on the world, of inhabiting a body and situation”. (Merleau-Ponty et al., 1968, p. 62). The *Other* is there, reaching me, touching me, but I cannot reach its essence, it is transcendent. For me, there is only one nothingness and that is my own, my own freedom. I can only view the *Other* as a superficial clone of myself. This type of analysis, Merleau-Ponty states, “makes of the other an anonymous, faceless obsession, an other in general” (Merleau-Ponty et al., 1968, p. 72). As explained by Jack Reynolds (2014, p. 134), Sartre is accused of ignoring “the way in which otherness is always intertwined with subjectivity”. This inscrutable gap between the *Other*’s will and the flesh of the world pushes us once again into the chasm of fetishism. In one of the footnotes in *The Visible and the Invisible* (Merleau-Ponty et al., 1968, p. 81), Merleau-Ponty notes a more general problem in what he names “philosophies of the negative”, such as the one posed by Sartre: they tend to refer to to the problem of *the* other and not *an* other; “a non-I in general”. This generality is exactly the type of abstraction that Sarah Ahmed is problematizing in her work. The connecting thread between *Stranger Fetishism* and the philosophical critique of Merleau-Ponty is our ability to view the *Other* as a subjectivity in the flesh, as a body whose consciousness is interconnected to our body, perhaps only then we can truly respect the other’s alterity, inspect its nuances and perceive our interactions without prejudice. Merleau-Ponty defines this as \_intercorporeality“\_.

The final chapter in *The Visible and the Invisible*, titled *The Intertwining-The Chiasm*, is Merleau-Ponty’s last and only attempt to devise a positive ontology of the world, the ontology of *flesh*. Albeit the thoughts end abruptly, this chapter and its surrounding notes and essays lay a foundation to a vast array of contemporary philosophy. Ironically, as a prerequisite to the ontology Merleau-Ponty asks us to give away our primal need for absolute logical truth, for a *thesis*. To retreat the Bird’s eye view of idealized logic, to live in the moment. Any attempt for logical truth would be sucked into an enveloping *Being*, leaving only a void *Nothingness* at the core. Instead, he proposes a dialectic that is an endless interrogation, void of significations “We are not asking ourselves if the world exists; we are asking what it is for it to exist” (Merleau-Ponty et al., 1968, p. 96). It is futile to try and freeze the notion of *Being*, because we are an inseparable part of it. The world that we are trying to resolve is perceived only by us, a body that is part of that world. “The effective, present, ultimate and primary being…offer themselves therefore only to someone who wishes not to have them but to see them, not to hold them as with forceps, or to immobilize them as under the objective of a microscope, but to let them be and to witness their continued being” (1968, p. 101).

Our recognition of the world stems from the fact that we are of it, the seer is also visible. Our body perceives under the same rules that the universe operates, all made of the same *flesh*. Of course, we maintain our *invisible* state, our private experience of colors, sounds and feelings, but that experience is directly attached to the same flesh, and is a direct result of our body’s openness to the world. Then, every action we take or idea we conceive is a physical response of our body to the world. The conception of an idea is nothing but “coiling up or redoubling” (1968, p. 114) of the bodily experience. It is out body sensing, then modifying itself, learning something new, only to once again open up and interact with the physical world, whether it is by speaking out or any other act. This is a somewhat of a general abstraction to John Dewey’s “Learning by Doing” (1923): According to the theory of *flesh*, even reading a book would be an active physical movement upon the world in which our eyes touch the pages of the book as we sense reactive force with our entire body: “between my body looked at and my body looking, my body touched and my body touching, there is overlapping or encroachment, so that we must say that the things pass into us as well we into the things” (Merleau-Ponty et al., 1968, p. 123). Could an increased exertion of the body lead to an increased capacity of learning? A 2012 study by the Finnish national board of education reviewed the recent research on the subject and concluded that this is indeed the case, noting that “motor and cognitive skills would appear to develop hand in hand, because the same mechanisms of the central nervous system are responsible for controlling both motor and cognitive skills in parallel” (Syväoja et al., 2012). We are interested, however, not only in the learning and assimilation of simple facts such as Newton’s law of mechanics, but also in the internalization of social meanings such as the image of the stranger or the acquisition of new behavioral patterns in society.

For Merleau-Ponty, our interaction with another human being is what validates our existence in this world, in the *flesh*. It provides us the recognition that we are visible as much as we are seeing. This recognition is based, according to Merleau-Ponty on a primordial intuition that we all all of the same *flesh* in the same universe, that our actions are undeniably seen by another as much they are seen by us. He makes the bold statement that the subjective experience of another is not completely hidden from us, because it is physically manifested in our shared space: “it suffices that I look at a landscape, that I speak of it with someone. Then, through the concordant operation of his body and my own, what I see passes into him, this individual green of the meadow under my eyes invades his vision without quitting my own, I recognize in my green his green” (Merleau-Ponty et al., 1968, p. 142). This recognition opens before us the entire universe of intersubjective being, since by transitivity we are all seen and touched by one another: “What is open to us, therefore, with the reversibility of the visible and the tangible, is— if not yet the incorporeal— at least an intercorporeal being, a presumptive domain of the visible and the tangible, which extends further than the things I touch and see at present.” (Merleau-Ponty et al., 1968, p. 143).

This conviction could be interpreted in a weaker or a stronger sense. In the weaker sense, it lays the foundation to social aspects of contemporary cognitive science disciplines such as enactivism and embodied cognition, as well as philosophical concepts as Performativity. Research in those fields asserts that we define and express our social identity through bodily interactions with others - Through acting, reenacting and resonating to the physical actions of others. For example, the phenomenon of *mirror neurons*, although much more complex than the popularized interpretation of its name, is still being researched today and is exemplifying models of how the perception of bodily actions by another resonates within the correlating areas of our own motor cortex (Craighero, 2014). Another notable example comes from a phenomenon known as social rhythmic entrainment - It describes how people bond through synchronized movements, whether they are dancing together to the rhythm of music or or even walking at the same pace (Stupacher, Wood, & Witte, 2017). In the stronger sense, however, intercorporeality is not only our social, epistemic backbone, but our metaphysical one as well. It is constitutive to our sense of existence and our faculty of perceiving reality. This notion might explain why losing our social meaning may feel like a violation of our own existence. It also deepens role of physicality in our own subject of matter, the encounter with the fetishized stranger. If the bodily interaction with another is so significant that it reaches into the core of our being, it must be necessary for any kind of transformation to occur in our belief systems. In an interview with Dr. Yael Berda, an Israeli sociologist and political activist who focuses her work on the intrinsic social mechanisms of the West Bank occupation, she described her experience of crossing the separation barrier (Litman, 2018). According to Dr Berda, in order to relieve ourselves from our instinctive fear of the Palestinians, we must undergo a physical experience of crossing to the other side, because the fear is in the body. This sentiment is affirmed by Sarah Ahmed, who analyzes fear as dynamics of shrinkage and expansion of bodies: “fear works to restrict some bodies through the movement or expansion of others.” (Ahmed, 2014, p. 69). For Ahmed, fear has an element of demarcation, effectively determining which bodies pose a threat and which bodies are under threat. It is then no surprise that Dr Berda, and myself included experienced such a transformation and relief simply through physical movement. The movement in itself was an act of liberation.

Now that we have determined the importance of corporeity for a transformative and meaningful social encounter, we must ask the question of whether an event of incarnation, i.e the physical grounding of an encounter with a body that previously existed only as a fetishized image of the stranger, can be mediated using technology. Such a mediation would clearly cause attenuation - A reduction and an abstraction of the subject’s corporeality into a different set of signals. On the flip side, it would allow us to increase the accessibility of encounters, to perform them on larger scales and perhaps even to grant more freedom to the interlocutors as a result of the mediating layer serving as a protective shield. In essence, we wish to try and replicate as much as possible of Merleau-Ponty’s concept of *flesh* when it is mediated by technology. The term *techno-flesh* was coined by Peter-Paul Verbeek, one of the pioneers of postphenomenology, as part a keynote he presented at Tel Aviv university (**???**). Postphenomenology, a discipline originally founded by American philosopher Don Ihde, seeks to explore the relations between humans and technology from a phenomenological perspective. We would turn our focus now to research in this field that may help in our quest for achieving techno-flesh.

## Postphenomenology and techno flesh

In a work by Aud Sissel Hoel and Annamaria Carusi Merleau-Ponty’s writings are analyzed in an attempt to extract his views on technology in relation to his ontology of flesh (Rosenberger & Verbeek, 2015, p. 73). According to Hoel and Carusi, the basis for Merleau-Ponty’s view on technology lies within his general critique of what he refers to as an operationalist view on science, as outlined in “Eye and Mind” (Merleau-Ponty, 1964). Merleau-Ponty denotes the mistake in viewing the products of science as a representational reality, external to the things themselves and isolated from the bodily perceptive processes that conceived them. He compares that to painting, which he asserts is a direct manifestation of our intertwined experience of perception. The incorrect view on science is traced back to Descartes “whose theory of vision fails to recognize the internal complicity between vision and world” (Rosenberger & Verbeek, 2015, p. 78). However, Merleau-Ponty does not criticize Descartes’ theory of a virtual mathematical space in itself, but only the operational way of thinking about that space as an ontological truth. His solution through flesh, according to Hoel and Carusi, is what differentiates the theory postulated in *Phenomenology of Perception* and his later writings. In *Phenomenology of Perception* Merleau-Ponty articulated the role of the body in raw sensory perception, but was unable to account for the creation of conceptual meanings, leaving us with a withstanding dualism of body and thought. With flesh, however, ideas, concepts, perception and matter are all of acting under the same fleshy medium. For this, Hoel and Carusi have “coined the term the “measuring body” to emphasize the “in-each-otherness” (Ineinander) of the material and ideational aspects of mediation” (Rosenberger & Verbeek, 2015, p. 79). A measuring body is anything that participates in a system of interaction in the common space of our universe. Since it operates within the same flesh, it exhibits what Merleau-Ponty refers to as a general style of being (Merleau-Ponty et al., 1968, p. 109) that can be recognized by any and intertwined with any fleshy agency. This includes both perception and ideation, but it is accentuated that in accordance with Jakob von Uexküll’s notion of *Umwelt* (Von Uexküll, 1982), one that was also favored my Merleau-Ponty, each measuring body exists operates and transforms under its own world of meaning while still participating as a part of a bigger whole *interworld* (Hoel & Carusi, 2018, p. 16). The metaphor of *circuit* is also used to describe the “space of mutual and co-constitutive interactions” (Hoel & Carusi, 2018, p. 11).

How do tools and technologies participate in this fleshy circuit? Hoel and Carusi refer us to Merleau-Ponty’s discussion on ‘technical objects’ in *Eye and Mind* (Hoel & Carusi, 2018, p. 20). While Merleau-Ponty’s discussion focuses on the mediating and reflexive properties of paintings, he mentions them to be at the same category of tools and other techniques of the body that “outline and amplify the metaphysical structure of our flesh” (Merleau-Ponty, 1964, p. 168). For Merleau-Ponty, a painting is unlike a thing of all things that is observed passively by a viewer. A painting contains the embedded carnality of the painter and is constantly enacting the private experience of its creator in a dialog with the viewer. Nevertheless, we cannot overlook the fact the creator’s body is seen as a point of origin, albeit being an ever-changing body schema that is in dialog with its environment, it is still recognized is the agency of the painting. It is there where Sissel and Carusi wish to take it further: “We further develop his idea of the body as a ‘measure’ of things by granting symbolisms and tools the status of ‘measures’ in their own right, that is, as ‘agencies’ with their own relative autonomy” (Hoel & Carusi, 2018, p. 23). Technology is seen as a “generative mediator” operating within and producing its own contingent dimensions: “For each modification new dimensions of the world open up, new ranges of possible modes of measuring and being measured” (Hoel & Carusi, 2018, p. 21). Thus, this goes beyond the decentralization of agency and into the decentralization of observation; the tools and technologies we create manipulate a shared space of perception. Sissel and Carusi recognize this approach resonates with contemporary posthumanist and new materialist approaches such as those of Karen Barad (2007) and Rosi Braidotti (2017). Such approaches open up the possibility of a mediated flesh, insofar as they recognize the interconnectedness of bodies and thoughts and the capacity for corporeality, and thus also intercorporeality, to be manifested remotely. However, they also risk the flattening of any experience to one variation in flesh, losing the meaning of a difference in form and function. We require a deeper investigation into mediation to determine its nature in social interactions.

Let us take a step back from the expanded conclusion regarding measuring bodies and focus on our scenario of mediated encounters between people. Clearly, not all mediations are one and the same and not all technological tools are utilized in a similar fashion. We are looking for a solution to a re-embodiment of the fetishized stranger; an incarnation that could carry the fleshy nature of the subject’s body, along with its own mediating measures, and facilitate a relief from prejudice through communication. It would be worthwhile to return to Merleau-Ponty’s analysis of painting in *Eye and Mind*, since this would be his most highly regarded example of mediated corporeality. Merleau-Ponty refers to an epitomizing discussion with French artist Auguste Rodin (Auguste Rodin, 2012, p. 34), analyzing the movement of a galloping horse in a painting by Théodore Géricault (see fig. 1).



Figure 1: “The 1821 Derby at Epsom” by Théodore Géricault, 1982. Retreived from Wikipedia (https://en.wikipedia.org/wiki/The\_1821\_Derby\_at\_Epsom). In the public domain.

Merleau-Ponty asks the following question: “When a horse is photographed at that instant when he is completely off the ground, with his legs almost folded under him—an instant, therefore, when he must be moving—why does he look as if he were leaping in place? Then why do Géricault’s horses really run on canvas, in a posture impossible for a real horse at the gallop?” (Merleau-Ponty, 1964, p. 185). The answer if provided by Rodin: “It is the artist who is truthful, while the photograph is mendacious; for, in reality, time never stops cold”. Even though the horse is painted in a position that is illogical, the movement is well transmitted from the artist’s expression into the painting. Not only the movement, but the also the intention of the artist; Merleau-Ponty concludes: “Painting searches not for the outside of movement but for its secret ciphers, of which there are some still more subtle than those of which Rodin spoke. All flesh, and even that of the world, radiates beyond itself” (Merleau-Ponty, 1964, p. 186). It becomes clearer that an accurate mediation of flesh should embody not only the source’s movements, but also their inner intentions, their creation and experience of the world. For example, compare a Skype call to a collaborative music jam. The Skype video transmission undeniably incorporates communicative features of the transmitter such as their voice and facial expressions, but it also loses part of the flesh. One difference between a digitally sensed representation and a painting or a musical composition is the passivity of the medium. With a camera, the transmitters are not actively involved in the creation of the resulting image, they are sensed by it, but the image forms on its own. It does not emerge from their flesh. Indeed, from a perspective of new materialism and measuring bodies, the camera sensor is very much intertwined with the source’s flesh and should capture all of its qualities, but the difference lies in what Hoel and Carusi ascribe to flesh as “its formative role as productive negativity”, alluding to Sartre’s notion of secreted nothingness. Productive negativity is the reversible quality of flesh - the power to shift between phases as when one hand is touching the other and we shift between the perception of touching and the perception of being touched. The gestalt effect of our consciousness as a willful phase shift occurs and makes Noboyuki Kayahara’s spinning dancer change direction (Parker-Pope, 2008). In short, it is the emergence of meaning that is actively created by a subject.

In this moment we are faced with a crossroads - We need to choose one of two strategies. Do we a) Focus on producing better and greater sensors, that are able to not only catch the most intrinsic and subtle fleshy qualities of the subject, but also represent them in an authentic manner, or b) Create more expressive tools that allow the subject to consciously and willfully express their own flesh, as artists do with painting. Granted, option (b) requires more effort from the interlocutors to be in touch with their inner qualities and to learn new and creative forms of expression, while option (a) defers the work to the technology, allowing the users to be more passive in communication. *Mindfulness* is a form of inner-self connection that could be used to improve self-expression. Numerous researchers have shown that mindfulness could have health and social benefits such as stress reduction (Grossman, Niemann, Schmidt, & Walach, 2004), greater empathy (Walker & Mann, 2016) and success in education (Leland, 2015). It is then apparent that opting for (b) could be beneficial for society while option (a) has a risk of doing the opposite. Moreover, in (b) the expressing subjects have a direct and controlled connection to the communication medium, allowing them learn and adapt to it, while in (a) there is an inherent barrier between the productive negativity of the subject and the medium, making adaption harder and more reliant on the technology. With this in mind we can move forward to considerations of the materiality and form for the medium of incarnation.

## Materiality of Flesh

Merleau-Ponty describes flesh as “a certain manner of being” (1968, p. 115), as well as an essence or style of existence in time and space. This does not refer to some objective science of the universe such as the laws of quantum physics and general relativity. Instead, it is the essence of nature as it appears through our bodies; the laws of the universe as they are experienced, only later to be abstracted and induced through the ideation of math and physics, a pronounced physical act on its own right. In the previous chapter we have determined that an optimal medium for the transfer of a corporeality has to be expressive, but what about the materiality of that medium? While a painting may be best for capturing the visual corporeity of a subject, it is clear that Merleau-Ponty’s concept of flesh encapsulates other senses as well, and in fact he sees vision and all other senses as a particular type of touching: “We must habituate ourselves to think that every visible is cut out in the tangible, every tactile being in some manner promised to visibility, and that there is encroachment, infringement, not only between the touched and the touching, but also between the tangible and the visible” (1968, p. 134). Moreover, in his description of flesh, and in particular the description of intercorporeality, Merleau-Ponty assigns a special status to tactile sensing. When describing the reversibility of flesh, the power to shift our attention from touching and being touched, and when describing our body’s relation to things that exists beyond it. Merleau-Ponty articulates the difference between touching a thing, experiencing it from the standpoint of our body, and touching another, which we pre-reflectively recognize to be another sensing body: “For the first time also, my movements no longer proceed unto the things to be seen, to be touched, or unto my own body occupied in seeing and touching them, but they address themselves to the body in general and for itself (whether it be my own or that of another)…the body no longer couples itself up with the world, it clasps another body, applying [itself to it] carefully with its whole extension, forming tirelessly with its hands the strange statue which in its turn gives everything it receives” (1968, p. 144).

There is a special and immediate reciprocity that is associated with touch and bodily gestures; it is when our actions and intentions toward another are met with a direct response, when are physical presence and its affect on other bodies is most accentuated. Numerous researchers have shown great correlation between physical contact and the cognitive development of sociality. It was shown that maternal-newborn contact has a long-term effect over a child’s physiological organization and cognition (**???**) and that tactile interactions are constitutive to all of our social bonds (Goodwin, 2017). However, before going deeper into the intercorporeality of touch, let us consider its materiality. In our context, the term *materiality* is in accordance with N. Katherine Hayle’s definition of “physical qualities that present themselves to us” (Hayles, 2014). We can regard materiality as phenomenological, rather than a scientific, analysis on the properties of matter. Archaeologist Lambros Malafouris follows the footsteps of phenomenology and new materialism; his vocational perspective, introduces a comprehensive framework for a body and matter based cognition dubbed the “Material Engagement Theory” or MET (Malafouris, 2013). While Malafouris does not directly address notions such as telepresence and re-embodiment, he does refer to the essential role of material properties in the emergence of meaning when using tools, focusing on activities such as clay making and knapping: “form is not imposed from the outside; it is, rather, brought forth or revealed from the inside. What we call ‘form’ exists as a surface property rather than a static mental event. It exists where the projective mind meets the material at hand (stone, clay, or metal). More important, ‘form’ is always ‘informed’ by the properties of the material to which it gives shape.” (2013, p. 177). This view on tools and technology bodes well with postphenomenology, and indeed Malafouris and Don Ihde have produced a joint publication discussing the role of material cognition in creative processes (Ihde & Malafouris, 2018).

Despite the intuitive interface between MET and postphenomenology, a scant amount of research in those disciplines was dedicated to the understanding of how different material properties in modern technologies affect our cognition and modes of engagement. Perhaps this is due to the fact that the vast majority of our engagement with contemporary technologies of mediation involves gazing on flat display and interacting with them using limited touch gestures. One study by Blazquez Cano et al (2017) found increased user engagement on a touch display when shopping for fashion, but there have not been extensive inquiries into the dialectics between the human body and our devices for daily use. However, when seeking a technologically mediated experience that is more physical, and involves ample material engagement, it is apparent that the field of robotics could provide an answer. Robots come in different shapes, forms and materials, and our interaction with them has more physical depth. When considering the difference between the Cartesian view on reality and the richer, more corporeal notion of flesh, it is clear that interactive display fall in the former category while robotics have the potential to deliver a fleshy experience of mediation. It is left to inquire about the various materialities of robots and their efficacy for a medium of incarnation.

While in industrial roots, the only consideration for material properties has been the capacity of the material to perform a desired function, three emerging technological fields are placing more emphasis on materiality. Firstly, the field of *wearable electronics*, consisting of functional garments, clothes and accessories that blend textile-based materials with electronic circuits, secondly, the field of *social robots*, that aspires to conduct intimate and harmonious interaction between humans and robots, and thirdly, the field of *bio robotics* that uses robotic actuators to perform medical operations on the human or animal body. As emphasized by Fortunati (2003) and Katz (2017), the underlying thread between these two trends is an attempt to unify the human body with information and communication technologies, or ICTs; to bring them closer and closer until the borderlines between the artificial and the organic vanish completely. As an umbrella term for robotics that use soft materials, the term *soft robotics* is now widely accepted (Bao et al., 2018). Elda Danese studies the cultural implications of the appearance of such “soft machines” (Danese, 2003). She notes how the elasticity of wearable electronics allows them to conform and adjust to underlying structures, granting the capability of the machines to adapt to the environment and the human body. She also notes how the use of soft materials in android robots is “altering their metallic and geometric qualities to achieve more empathetic, naturalistic form” (2015, p. 130). Soft material technologies are being used not only to produce devices that try to mimic biological mechanisms and appear organic, but they are also producing futuristic forms, that while exhibiting flexible properties, still carry a post-human or non-human form. This is apparent not only in fashion-tech as noted by Danese (Danese, 2015, p. 137), but also in media art, as exemplified by Jonas Jørgensen, who both studies and utilizes soft robotic technology for artistic purposes (Jørgensen, 2019). He notes that “soft robots are more often bio-inspired than biomimetic. That is, rather than being copies or technical remediations of biological mechanisms aimed at exact replication they extrapolate these,following their virtual lines of flight” (2017, p. 5).

Thinking about soft robots through the perspective of flesh, it is evident that soft materials have a better capacity to interact and synchronize with the human body and the environment. They are ontologically closer to the material properties of the human body and are more receptive to its intentionality and expression. Further more, in the context of flesh it is critical to consider the soft robotics style of movement. In a paper by Guy Hoffman of the Media Innovation Lab at IDC, Israel (2014), a convincing argument is outlined as to why we should pay more attention to movement, rather than just form, when designing robots. Hoffman cites a body of research concerning non verbal acts and gestures in humans to support his argument. From the point of view of phenomenology, this appears natural: movement of the body is at the core of perception and perhaps even of consciousness (Carman, 1999). We would dedicate more thought to matters of body language in the chapter about intercorporeality, but let us consider the role of materiality in movement.

Why is it that some materials seem to move in a style that appears more organic and more lifelike than others? Machines could have astoundingly complex inner mechanism with plenty of degrees of freedom, yet in our view they still do not portray the same materiality as organic entities. The answer may present itself when we consider the *linearity* of movement. If there is one repeating quality in natural processes, it is the self-organization of fractal-like patterns that emerge out of a complex dynamic of inter-connections (Strogatz, 1994, p. 9). If there is one quality that defines those patterns, it is their nonlinearity. Organic systems and processes like the formation of mountains, rivers and flora move in a style that exhibits predictable patterns, but is non linear at its core. In animal kinetics, the neuromuscular system itself exhibits nonlinear properties (Brezina, Orekhova, & Weiss, 2000). In the world of robots, even if an android’s arm is covered with a soft material, when the android moves its joints, the linearity of the underlying servo motor is apparent. The software could even try to imitate nonlinearity by shifting the speed of the motor between steps, but the underlying discrete and linear materiality would uncover itself from beneath the flesh. That is not the case with soft robots made of silicone rubbers, textiles and other stretchable materials. Those materials have an inherent nonlinear dynamic style of movement. Even the most basic form of soft movement, a pneumatic system controlling the inflation of a party balloon, the movement seems more organic than that of the most expensive android robot.We should now consider however the caveat of a seemingly organic incarnation, the uncanny valley.

## The Uncanny Valley

When working with robotic mediation and the study of incarnation, one could not proceed without considering the implications of the uncanny valley. In a seminal work by from 1970, Masahiro Mori articulates his intuition about human attitude toward robots that become increasingly more human-like (Mori, MacDorman, & Kageki, 1970/2012). The intuition is fairly simple (see fig. 2): As a robot gradually becomes closer to a human’s form, our affinity to that robot increases, but only until it reaches a certain point where it becomes too similar to a human, yet obviously not human - then our affinity drops into the so-called valley. When the object continues to get closer to human until the differences are indistinguishable, our affinity grows again. The graph, therefore, has two peaks of positive affection: (1) When the robot exhibits some human-like qualities but does not pretend to be human, and (2) When we are so immersed in the experience that we imagine the object to be human, not noticing the differences. For the second peak Hiro describes the experience of a Bunraku puppet (see fig. 3). According to Hiro we become so immersed in the puppet theatre that we do not pay attention to the difference between the puppet and humans and imagine it is being a real figure.

However, Mori does not recommend designers to pursue the second peak and instead formulates a strategy for conquering the first peak: “Because of the risk inherent in trying to increase their degree of human likeness to scale the second peak, I recommend that designers instead take the first peak as their goal…I predict that it is possible to create a safe level of affinity by deliberately pursuing a nonhuman design. I ask designers to ponder this. To illustrate the principle, consider eyeglasses. Eyeglasses do not resemble real eyeballs, but one could say that their design has created a charming pair of new eyes” (Mori et al., 1970/2012). According to Mori, both the valley and the first peak become steeper when considering not only human-like form, but also human-like movement. In this case the most extreme feeling of uncanniness would rise from a moving corpse, i.e a zombie.

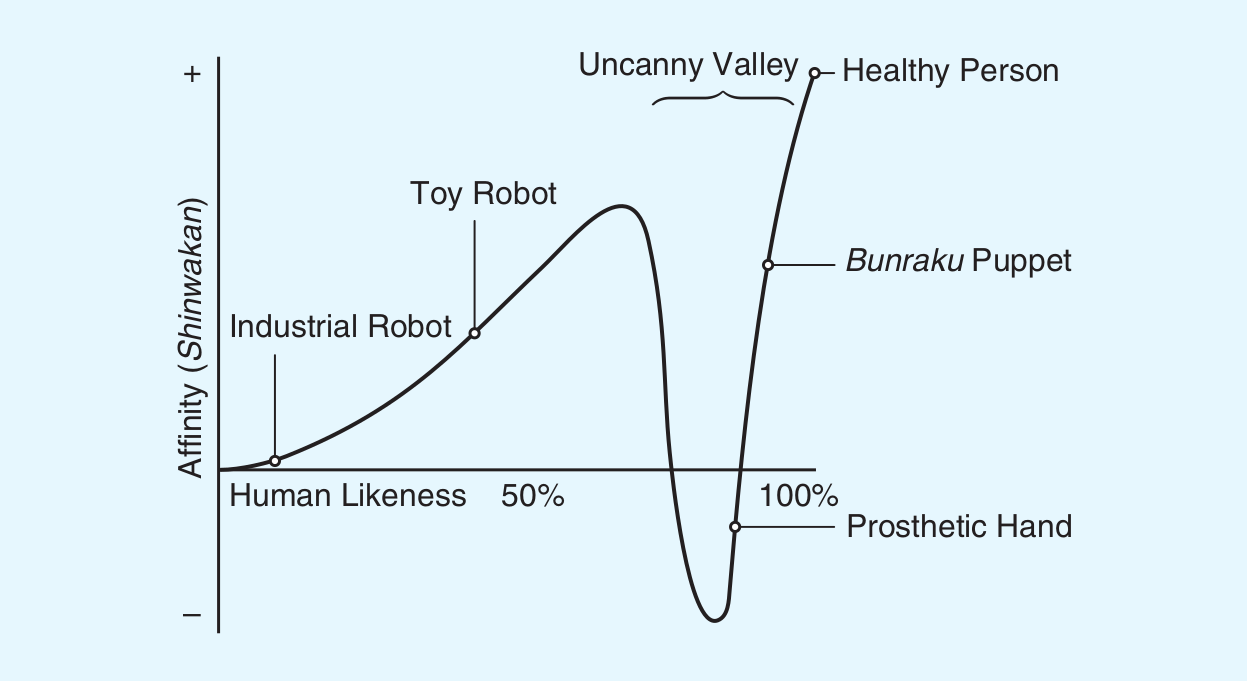


Figure 2: The uncanny valley, from Mori et al. (1970/2012)



Figure 3: A femaile bunraku puppet. Retrieved from https://en.japantravel.com/tokyo/bunraku-performance-by-young-performers/59089

When we look down at the uncanny valley within the scenery of incarnation, the resulting topography is intuitively different. A new proposition is added at the foundation - regardless of the robot’s form, we now assume that a human spirit rests inside the robotic body. Now when encountering a toy robot, a fury animal or a life-like moving worm, our perception knows that this form represents a human nonetheless. This might increase the level of uncanniness even at earlier stages of human likeness. Additionally, we are looking to form a perception of the human behind the robot; perceiving the human as a worm might make us regard it as inferior or weak. The uncanny valley graph therefore becomes three-dimensional: we not only care about the affinity toward the robot, the incarnation, but also toward the controller, the spirit.

We should then find a form and function that rests on the peaks of the uncanny valley but also pays its respect to the controller; a form that goes beyond human but preserves the human spirit. If robots that appear to take the shape of a human are called *Humanoids*, perhaps we should be looking at the *Posthumanoid*: a form that does not erase the human, but instead blurs the lines between the human and nonhuman and reimagines the humanoid form. We can now formulate the final goal of incarnation, the actualization of *Logos*.

## The Logos of Incarnation

The events of reification and incarnation somewhat similar in nature; both of them pertain to an embodiment of immaterial properties into a physical entity. Their quality, however, is radically different. While in reification we fetishize the object (or person) by endowing it with spiritual aspects that travelled from far away in the mazes of our collective mind, in an event of incarnation we imagine the true spiritual essence of the subject that was previously invisible, materializing into physical form, open for all, grounded and accessible. In fact, the forces of incarnation ideally defeat those of reification. They relieve us of our prejudice and biases and confront us with the true spirit. In political theory, we might think of incarnation as an actualization of *Logos*.

In Aristotle’s *Rhetoric*, logos is the logical reasoning behind one’s rhetorical argument, as part of the three modes of persuasion: logos, ethos and pathos (Matsen, Rollinson, & Sousa, 1990). In modern political theory, Jacques Rancière uses the word logos to attest to a person’s political voice; a voice that should no be taken for granted: “Politics exists because the logos is never simply speech, because it is always indissolubly the account by which a sonorous emission is understood as speech, capable of enunciating what is just, whereas some other emission is merely perceived as a noise signaling pleasure or pain, consent or revolt” (Rancière, 1999, p. 22). Thusly, logos is acquired or deprived in a social context. Rancière brings up the story of the plebs, a group of citizens in ancient Rome who revolted against the patrician elite. Their opposition was not on the count of poverty or hunger, but of speech, a common stage in which the plebeians and patricians could debate: “The position of the intransigent patricians is straightforward: there is no place for discussion with the plebs for the simple reason that plebs do not speak. They do not speak because they are beings without a name, deprived of logos - meaning, of symbolic enrollment in the city” (Rancière, 1999, p. 23). Without logos, the voice of people is reduced to the voice of an animal, expressing only primal emotions of pleasure and pain. In one occasion Israel’s P.M Benjamin Netanyahu has referred to Muslim combatants within and around Israel as “animal predators”, when speaking about the need for a border wall between Israel and Jordan[[1]](#footnote-2). In another occasion, Netanyahu has warned of Israeli Palestinian Arabs “flocking in droves to the polling stations”[^https://www.haaretz.com/israel-news/elections/.premium-netanyahu-is-scaring-out-the-vote-using-his-most-reliable-weapon-1.7803150]. The use of such rhetoric clearly implies the denial of logos from Palestinian citizens and adversaries.

How does one then ensure the authenticity of a person’s logos through a mediated encounter? Edgar Orion draws a direct line between Merleau-Ponty’s ontology of flesh, the notion of incarnation and the recognition of logos (Edgar, 2012). According to Orion, the Christian notion of incarnation is not far from Merleau-Ponty’s assertion that the imaginary boundary between mind and body can and should be erased: “the religion of God incarnate, of the logos made flesh, has a long tradition of thinking of the intertwining of thought and action, of soul and body” (Edgar, 2012, p. 7). Orion argues that “the transcendence of depth reveals a logos in things, a God ‘on the other side of things…a conception of nature as the ‘soil’ which gives rises to this logos”. This depth is transcended through what Simone Weil recognized as “vertical movement”, symbolized by the cross (**???**). Through enactive perception, we uncover the invisible style of the flesh, and when perceiving a human body, the flesh uncovers logos, the physical movement of that body that actualizes the essence of consciousness.

When analyzing the differences between the real world and cyberspace, Borgmann as well encounters the vertical dimension. He compares between two types of richness that he claims are missing from the virtual world: richness in width and richness in depth (Borgmann, 2000, p. 95). Richness in width is defined as *continuity*: It is the difference between the discrete, divided nature of pixels and bytes and the continuous, infinite bandwidth of the raw material that we perceive in the real world. One may claim that as we increase the resolution of digital devices we will eventually reach the resolution of the real world, or at least a resolution that could deceive the human eye or ear. But perception is not an atomic sensing of a still image made from pixels; it is, as Merleau-Ponty asserts, a movement of our body and our eyes in the world. As our body and brain move, collect and process the vasts amount of information that is presented in the outside world, our conscious experience emerges. This incalculable amount of data is what Borgmann refers to as vertical depth: “As information theorists have remarked, reality is informationally inexhaustible. Things, events and situations display a depth of properties and relations that no amount of propositions can capture” (Borgmann, 2000); he defines vertical richness as *repletness*.

There is no escaping the fact that when performing physical mediation, for instance through a robot, while the interlocutors may experience the true logos of the robot medium, they will not be experiencing the true logos of the controller. The political voice and essence would still be restricted to those transmitted by the robot and may be reduced due to the digital processes that occur in transmission. It is plausible, however, that a mediated physical logos, one that stays as close as possible to the free and active will of the controller, will have more presence and meaning than a flat, virtual avatar. This is because of our pre-reflective capacity to recognize a voice in the flesh and pay our attention and our respect to it. This can be investigated mostly through trial and personal experience. Before, however, we must shift our perspective to that of the controller and consider the various phenomenological aspects of re-embodiment.

# Phenomenology of Re-embodiment

## Agency and Ownership

The term *re-embodiment* is used by postphenomenoligists such as Besmer (Rosenberger & Verbeek, 2015, p. 55) and Dolezal (2009) to denote a mediated experience in which a subject assumes another body, physical or virtual, in a remote location. A previous term used for similar experiences was *telepresence*, first coined by in 1980 by Marvin Minsky, who applied it to remote object manipulation applications and their teleoperation systems (Campanella, 2000). However, as Dolezal notes, telepresence is normally used to describe a functional scenario in which the remotely manipulated environment is real and does not apply to virtual environments. Insofar as the experiences of virtual reality, avatar gaming and robotic telepresence have a common phenomenological nature of assuming control over another body, they can be grouped together under the term of re-embodiment. How about a Skype conversation? We would be inclined to assume that this is not a form of re-embodiment, since although the users assume a form in a remote location (on somebody else’s computer screen), they have no control over that environment and cannot manipulate it; they have no *agency*. But is that true? Imagine I was to shout so loudly during a Skype call that my voice broke a wine glass in a remote location, or that time the creators of South Park had trolled everyone’s Alexa devices using remove TV screens (Lockett, 2017). A sense of agency could be achieved even with a minimal effect on the remote environment. A more clear example of a Skype call that adds agency would be wheel based telepresence robots such as the ones produced by Beam (Patel, n.d.). In a virtual reality game, despite the fact that the environment I am manipulating is completely virtual, I still have sense of agency in that environment which contains my remote body.

The nuances of re-embodiment become more apparent when considering not only the notion of agency, but also that of *ownership*. Galagher (Gallagher, 2000, p. 15) distinguishes between agency and ownership such that agency is the “sense that I am one who is causing or generating an action, for example, the sense that I am the one who is causing something to move”, while ownership is “sense that I am the one who is undergoing an experience”. A lack of ownership could have moral implications on re-embodiment. According to Dolezal “Dissociation from ownership, induced by a lack of presence, has many ethical and epistemological implications and, furthermore, has phenomenological consequences in which the subject feels alienated from the actions he or she is performing” (2009, p. 218). Dolezal denotes an artwork titles “Legeal Tender” (Paulos, 1996) as the “first publicly accessible telerobotic website, where users, after agreeing to take full responsibility for their actions, could destroy or deface two allegedly real 100USD notes.” (2009, p. 210). This action is criminal act in the United States, yet In a study done by Dreyfus it was found that “most participants in the experiment responded that they did not believe that the notes and the experiment were real, and hence did not feel as though they were placing themselves under any risk” (**???**). This poses major concerns for more serious telepresence applications such as telesurgery, where a doctor uses a remotely controlled robot to operate on a patient’s body. If a doctor does not feel present during the operation, their sense of accountability could be hindered, risking the patient’s health (Dolezal, 2009, p. 211). An even more terrifying example comes from the world of remotely operated war drones. One study of drone killing in Pakistan between the years 2004 and 2009 found an usual amount of civilians that were killed by drones, citing the emotional and physical distance as one cause: “A 20-something Christian Air Force pilot living with her two children in suburban Las Vegas who views a monitor to locate her targets would seem to be as distant as a one can be from targets in rural, Muslim Pakistan. Television and YouTube video of drone pilots on the job reveal a set-up that looks very much like video game. These factors and others likely contribute to the high death rate among unintended targets” (O’Connell, 2009, p. 9).

According to Dolezal, the key factor that enables a sense of ownership is *proprioception*: the “kinesthetic and somatic sensations that permeate the body and give information regarding position, posture and movement” (2009, p. 219). Proprioception constitutes our *body schema*, a pre-reflective subconscious mapping of our body that allows us to act in the environment without explicitly thinking of each step and being aware of every movement. An emblematic highlighting the significance of proprioception is the case of IW, a man who has lost his of proprioceptive feedback due to injury (Gallagher & Cole, 1995). Despite the loss of this inner sense of the body, IW was not paralyzed and was able to re-learn how to operate in the world, however this learning was in a painstaking process in which IW had to forcefully map his intentions to the changes in his body; he had “lost the experience of body invisibility, which characterizes the normal and healthy experience of movement” (Dolezal, 2009, p. 219). Such an experience naturally entails a sense of detachment and alienation from ones own actions.

Phenomenoligists have shown how in the normal situation when the proprioceptive system intact, tools and technology could also be incorporated directly into our body schema. Merleau-Ponty’s famous example of the blind man’s stick defines the stick as “an extension of the bodily synthesis” (Merleau-Ponty, 2013, p. 176) and Don Ihde provides the examples of the eyeglasses - a relation in which “the technology becomes maximally ‘transparent.’ It is, as it were, taken into my own perceptual-bodily self experience thus: (I-glasses)-world” (Ihde, 1990, p. 73). However, as enunciated by postphenomenoligists, the experiences of telerobotics, avatar-based gaming and virtual reality are notably different from closely integrated tools and technologies such as the blind man’s stick and eyeglasses. Firstly, it is a matter of feedback - in order for the tools to be integrated into our body schema, there needs to be an immediate and consistent sensory feedback between the actions of our ‘original’ body and the mediated environment. Dolezal argues that the “coincidence of proprioceptive sensations to visual feedback of motion is the mechanism that induces a sense of ownership of action” (2009, p. 219), citing research by Martin (1995) and an experiment by Cole, Sacks and Waterman (2000). In the latter experiment, participants were controlling a robot from the driver’s seat in a mixed reality environment at the Johnson Space Center in Texas, experiencing immersive visual feedback to their actions from the robot’s camera. At one point the sense of ownership was sufficiently high to make participants worry when a heavy object was about to fall on the robot’s leg (Cole et al., 2000, p. 167).

While visual feedback that is concomitant to bodily proprioception is important for a sense of ownership, it may not be enough. Besmer argues the following regarding the transparent withdrawal of the controlling interface in robotic re-embodiment: “this second withdrawal is distantly different from the way in which bodily co-located tools and equipment—such as the blind man’s cane—recede from focal awareness to become integrated into the body schema. There is a decisive difference here, for bodily co-located tools become integrated into the body schema by offering robust tactile feedback and thereby participating in somatic proprioception. This is often not the case with remote robotic machinery” (Rosenberger & Verbeek, 2015, p. 61). Besmer suggests that the experience of robotic re-embodiment is more similar to IW’s case of a lack of proprioception than to the usage of blind man’s stick. Besmer argues that the same problem applies for virtual avatars in a simulated game - While the controlling technology may become transparent, especially in immersive environments, without proper haptic feedback that sufficiently transmits the sense of tactile nature of the remote environment, the avatar would always be at an infinite distance from the body.

Let us assume that mixed reality and telerobotics technology would eventually advance to a degree that they could transmit a high resolution experience to all senses of the controller. Dolezal’s intuition is that “even the most seamless experience of high-fidelity telepresence will remain qualitatively different from that of engagement with one’s immediate surroundings” (2009, p. 221). However, delving deeper into the difference between mediums, it is apparent that there is still a fundamental gap between a completely virtual reality experience and a telepresence in a remote environment. If we consider the possibility of techno flesh, there is an incommensurable difference in the dialog between the remote body and the environment. In the case of of a virtual environment, the environment is entirely simulated by software, while in the case of remote presence the environment is of this world. Notwithstanding the fact that the effect of the environment is eventually sensed and transmitted by an apparatus, a sensor that is placed in the world is still more far immersed in the flesh than a simulation. Having said that, there have been arguments, most notably the one by Bostrom (Bostrom, 2003), that we are likely to already be living in a universe that is simulated, but insofar as scientists are still struggling to grapple with the question in light of infinite micro and macro scale of the universe (Beane, Davoudi, & J. Savage, 2014), and insofar as we might not even be capable of dealing with that question because we are subjected to our own cognition of the world, the gap between the universe and our current knowledge of simulation holds firmly. A virtual reality experience takes us one step closer to the dualistic Cartesian-Lockian model of representational knowledge that is separated from our body, and such a model would have a greater risk of reifying our contrived images of one another, turning them into reality.

TODO: Ownership and how it is easy to press the virtual buttons even if it hurts the robot

TODO: Materiality paragraph

## Re-embodied imagery

In Donna Haraway’s seminal work *A manifesto for cyborgs, science and technology* (2006), she depicts a utopic techno-feminist vision of cyborgs - machine/organism hybrids that are freed not only of their military-capitalist creators, but also from sociological and biological constraints such as gender, race, sex and a need for reproduction. She wants us to transition from *body imagery* - An embodied conceptual cage that determines our world view and our political language, into *cyborg imagery* - A reconstitution of bodies and discourse “on the basis of seizing the tools to mark the world that marked them as other” (2006, p. 33). Nowadays, one might say that this vision is slowly realizing, with the advent of of social media as the de facto form of communication, virtual realities as a standard space for gatherings and technological modifications for the body becoming more and more prevalent. However, as Haraway noted, the confusion of boundaries with the help of technology calls for a skillful responsibility in their reconstitution: “is it not just that science and technology are possible means of great human satisfaction, as well as a matrix of complex dominations (2006, p. 39). Phenomenons such as cyber-bullying, public-shaming and virtual sexual harassment [TODO: ref?] prove that point exactly. We can now start to think not only about body imagery, but on *re-embodied* imagery: The effect that re-embodiment has on our world view and dispositions. This effect could be divided into two main categories: a) The effect on our social cognition that is due to the disassociation of agency and ownership. b) The effect of avatar’s nature on our image of self and in turn our cognition.

As the previous chapter suggests, and as most likely any one of us has experienced, a reduced ownership in re-embodiment allows us to not feel as accountable for our actions as in face-to-face communication. This leads to two outcomes, a positive and a negative: a) responsible

TODO: Gender Neutral voice TODO: My cognitive science presentation. TODO: Also about the visual appearance in VR anecdote in Dolezal.

# Intercorporeality

## Multimodality

We would not be doing justice to phenomenology if we analyzed the experience of technological mediation between humans merely from the fixed perspectives of each side. While it may be true that every communication act ultimately funnels into the individual, subjective experience of the interlocutors, some aspects of the experience cannot be defined by a simple one-directional relation between the environment and the subject. Instead, it is a dialectical process in which the final experience emerges from the modes of dyadic interaction. In face to face communication, the majority of meanings are created using common language and through bodily gestures. When using a technological medium, however, some modes are of communication are no longer available, some morph into different styles, while other completely new modes of interaction appear. An analytical framework that is useful for investigating various modes of communication and their role in social meaning-making is the framework of *multimodality*, particularly in the light of social semiotics. As defined by Gunther Kress (**???**), multimodality analyzes the different modes of interaction that are in play, while social semiotics deals with the specific meanings that emerge in specific situations. In-line with phenomenology, Kress suggests that we move away from more virtual definitions of communication such as language and grammar and focus on the materiality of meaning making: the specific modes and affordances of our body and senses: “the focus on on materiality offers the possibility of seeing meaning making as embodied - as in our bodies: a means of getting beyond separations of those other abstractions, mind and body, or affect and cognition” (**???**).

However, the robustness of mediated and re-embodied intercorporeal relations and their potential to exist through technology has been doubted by researches such as Dolezal (2009, p. 222), Dreyfus (**???**) and Stone (1991). Insofar as the experience one feels when communicating with a remote or incarnated medium is that of disassociation and alienation, that feeling becomes two-fold when applied to the most delicate and significant aspects of intercorporeality. Dolezal argues that “Physical contact and proximity between human subjects constitutes an important qualitative aspect of intersubjective relations that may never be obviated by technological mediums” (2009, p. 222). Dreyfus makes an even stronger argument, declaring “tele-intimacy” as an oxymoron - “because any sense of intimacy must draw on the sense of security and well being each of us presumably experienced as babies in our caretaker’s arms. Such claim is affirmed by research such as that of Ruth Feldman, showing that skin-to-skin touch between a mother and her newborn baby over 14 days could have cognitive influences on social dynamics for the first 10 years of the child’s life (Feldman, Rosenthal, & Eidelman, 2014). If such claims are true, even the most sophisticated forms of telepresence may well seem remote and abstract if they are not in some way connected with our sense of the warm, embodied nearness of a flesh-and-blood human being” (**???**). Both Dreyfus and Stone (1991, p. 13) refer to fact that a re-embodied body does not withstand physical risk to its composition, and therefore loses depth in the mediated interaction.

There indeed is no denying the potency of an immediate and imminent physical interaction. However, we could try to defer the feelings of romanticism, and without forgetting the Cartesian risk of losing our bodies in virtual flatness, consider the multimodalities of mediated intercorporeality and the affordances of various mediums.

## Verbal Langauge and Voice

In a popular research by Albert Mehrabian in 1971 (Mehrabian, 1971), it was stated that in determining the credibility of a salesperson during verbal interaction, only 7% of the impression is accounted to the actual content that is uttered by that person; 55% is accounted to body language and 38% is accounted to the tone of voice. This paradigm has since been challenged by researches such as Phillip Yaffe (Yaffe, 2011) who pointed out numerous flaws in Mehrabian’s research method. While the important auxiliary role of bodily signals during verbal communication is unquestionable, it would be wrong to underestimate the verbal modality, not only as a force of meaning on its own, but also as a cooperating and mediating force when other modalities such as body language are impaired.

Elizabeth Keating has studied various groups that are using different forms of telepresence as their daily means of communication (2017). She met with engineers who had to cooperate with people living in different locations around the world to achieve a single task, and also with gamers who were actually sitting together in one physical space, but were operating in a separate virtual environment where the avatars only shared an inter-virtual space, as opposed to the intermundane. As Keating notes, in situations where interlocutors are mediated by a technology “no shared metalanguage exists for them to talk about the role of bodies and how they mean in interaction (the engineers use the short hand descriptor “face-face” to mean the whole body). The movement and contrastive properties of eyes, the flexibility of the face to convey attitudes and emotions, the mobility of the hands to organize talk and manipulate objects, the sense of touch, the seemingly “natural” attitudinal displays of the limbs, and the body’s relation to others’ bodies” (2017, p. 305). However, technology also opens up new modalities and possibilities of communication, some of which may be used to mediate over the gaps that were initially opened in exchange for the increased range and mobility.

In Keating’s study of the engineers group, she found that they adapted to the lack of bodily interaction by “shifting to other modalities…they used spoken or written language instead of embodied signals” (2017, p. 313). However, the use of language was not always constructive; when the engineers used language to describe more of their internal and logical state, such as the sentence “Are you ready to start”, or “Do you want”, more clashes and misunderstandings emerged, but when they used language in a more descriptive matter as in “I’ve got it open” the conversation flowed more easily. Additionally, when the engineers used language to query for feedback that is normally captured by gestures such as nodding, gaze and facial expressions, as in asking the other engineers by name whether they were following the discussion, they were able to facilitate better (2017, p. 315). In the case of the gamers, similar adaptions were observed by Keating, despite the fact the mediated environment was completely virtual. The gamers adapted to technological challenges by “carrying on a constant narration to others about aspects of embodied behaviors happening on screen that can’t be seen by all players” (2017, p. 316). Using a constant flow of action-perception utterances such as “I see it”, “I hear it” and “I’m doing it”, as well as more specific descriptions of bodily states such as “I’m asleep” or “I’m immobilized”. Albeit the situation of the gamers is qualitatively different than that of the engineers, insofar as the gamers were using language to describe their own mediated subjective state in a virtual environment, the shared element between the two scenarios is the use of different modalities through technology to make up for ones that are lost. While we may assume that nothing could beat the directness of the gaze and the touch, it is not to be ruled out that other active, expressive modalities as a substitute.

As the power of language in mediated situations is now stated, we could examine the current modalities of language and voice that are enabled by contemporary technology. In regards to speech, there are three main scenarios in which a synthesized speech could be beneficial in a dyadic conversation where no autonomous artificial intelligence entities are involved: (a) As previously mentioned, voice alteration technologies allow us to alter our embodied imagery, such as having a gender-neutral voice or an alternative avatar from a fantasy world, (b) Speech synthesis allows a person to be able to speak even in cases when a certain physical impairment hinders their natural voice, or (c) Real time translation technology allows us to augment our verbal cognition and speak in languages that we’ve never actually acquired. In cases (b) and (c) where we might opt for maintaining the original characteristics of our voice but augment it with certain capabilities, technology has the capacity to learn and mimic a personalized voice using recording data (Mills, Bunnell, & Patel, 2014). In case(a) we might opt for a completely new and fresh voice, and in that field companies are now competing on creating the most expressive and natural sounding artificial voice (Xue, Zhu, An, & Xie, 2018). Most of the contemporary technologies for speech synthesis now use deep neural networks in one way or another, a technology that is growing rapidly, accelerating the development of speech synthesis to unimaginable levels.

In addition to augmentation that grants our voice with modalities that did not previously exist, it is imperative to take note of voice modalities that are important in intercorporeal communication. It is widely known that voice characteristics such as pitch, rate, intensity and timbre vary within expression of emotions (Murray & Arnott, 1993) and when considering a mediation of speech, the medium should allow the controller to alter these characteristics. Moreover, in a study of intimate intercorporeality in US families, Goodwin remarks on altering voice qualities during intimate contact: “We find in intense moments of intercorporeality when bodies intertwine that voice quality changes to creaky voice, pitch is lowered, and faces become more dreamlike; a universe is constructed that is for just these individuals. A creaky voice quality at low volume not only reverberates sound but also generates a catlike purring bodily sensation for those in close contact” (Goodwin, 2017, p. 96). Once again when trying to simulate these qualities we are bound to come in contact with the uncanny valley; it may prove useful to employ the strategy of human-nonhuman liminality for voice modalities as well.

## Emojis

A more recent modality that is associated with language is the use of *Emojis*. Emojis are a set of icons for the use of text based communication, standardized by the unicode consortium (“Unicode Emoji,” 2019). They allow us to express certain emotions or situations in text, adapting over the aforementioned gaps in mediated expression. Emojis were found to correlate with human sentiment (Novak, Smailović, Sluban, & Mozetič, 2015), are studied by psychologists to analyze human behavior (**???**) and are even suggested to be used in scientific literature to add additional expressiveness to academic texts (O’Reilly-Shah, Lynde, & Jabaley, 2018) 😲. The use of emojis is an accessible and open method for expressing elaborate meanings just by using text messaging; the medium could then translate the emoji to other modalities, whether by just displaying it on a screen, or by appropriating sound, movement and other physical elements.

## Body Language

A profoundly meaningful, yet highly elusive element of intercorporeality comes from our body language: Meaningful because despite Merleau-Ponty’s claim that speech and even ideation are acts of the body, the directness of bodily gestures provide a clear connection between social identity and the flesh that envelopes them, elusive because a large number of these acts are picked up only by our subconscious and because the line between the authentic and the uncanny is sometimes invisibly thin.

Due to its nonverbal nature, aside from modalities of sign language, body language is associated with emotional expression rather than structured, logical content. Its research dates back at least to the 19th century, when Charles Darwin published his work *The Expression of the Emotions in Man and Animals* (1890/1998). Darwin followed the path of evolution and attempted to find reasons and common origins for behaviors representing certain emotions. Those findings could be of interest to mediated intercorporeality insofar as finding new forms of expressions that are not solely human, yet belong to a common ancestor and are recognized by humans, could help finding paths around the uncanny valley. For example, Darwin sites the trembling behavior in response to stress and fear, that “is common to man and to many, or most, of the lower animals” (1890/1998, p. 70)

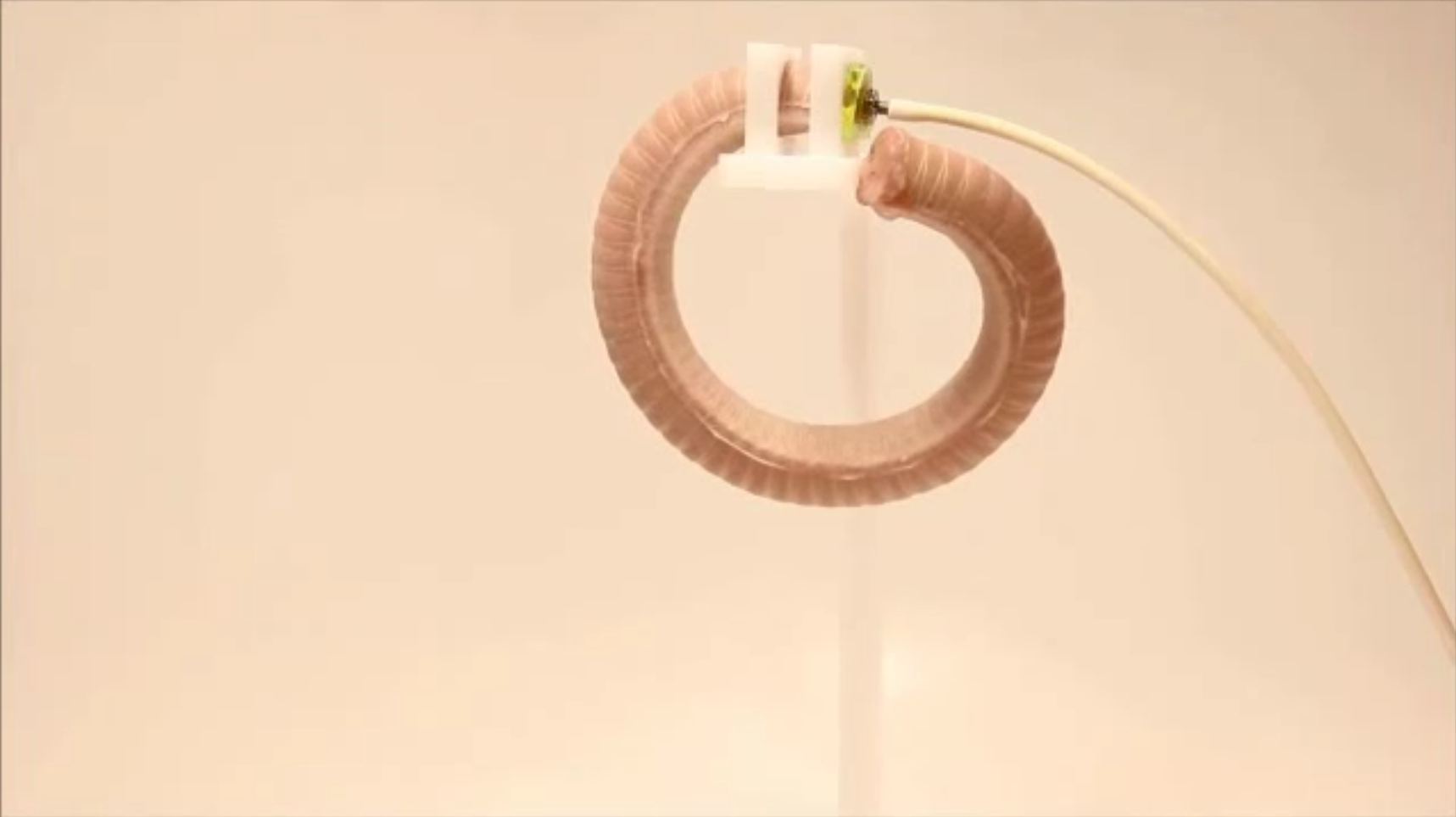
Darwin’s research may also inspire unique uses of materials for expression. In the case of soft robotics that are based on pneumatics, inflation of the outer skin is a natural movement. Such action could also be inspired by certain animals, as Darwin notes: “Chameleons and some other lizards inflate themselves when angry…Several kinds of snakes likewise inflate themselves when irritated. The puff-adder {Glotlio arietans) is remarkable in this respect” (Darwin & Prodger, 1890/1998, p. 111). Darwin follows this observation with his hypothesis that “they do not act thus for the sake of increasing their apparent bulk, but simply for inhaling a large supply of air, so as to produce their surprisingly loud, harsh, and prolonged hissing sound”. Current research suggests that animals use inflation mechanisms for a variety of reasons, some mechanical such as the puffer fish making itself harder to being swallowed (Brainerd, 1994) or toads inflating their bodies so they can roll and escape predators (Marchisin & Anderson, 1978), but some animals inflate in a strictly expressive manner, such as the hooded seal (see fig. 4) that inflates its nasal cavity to display aggression (Bishop, Lidstone-Scott, Pomeroy, & Twiss, 2014). Perhaps the mammal equivalent of fish and amphibian inflation would be piloerection, or “goose bumps” in humans. Darwin has researched the phenomenon, often witnessed in cats and dogs, and concluded that despite it being an involuntary action, it is likely that it gained advantage on the evolutionary continuum due to its ability to increase the “bulk of their bodies” (Darwin & Prodger, 1890/1998 , p.109).



While Darwin studied extensively about the reasons behind our various means of expression, the other part of the equation is the effect, or *affect* as defined by Zajonc (1980): our emotional reaction to a stimuli. Affects and their relation to movements of the body are studied extensively in dance choreography, and in particularly that of modern dance. Dance could be seen as an attempt to extract elements of bodily interaction from our daily social lives, and present them in an accentuated, distilled form. Sevdalis and Keller summarize a range of research papers articulating the connections between modern dance movements and our social cognition (2011).

A key figure in the study of expressive movements is Rudolf Laban, creator of LMA theory: Laban Movement Analysis. In what might seen as antithetical to the abstract and free-flowing nature of modern dance, Laban meticulously dissected and categorized movement and space into key elements and then extrapolated the results into their emotional significance. The theory is mostly laid out in two influential books: *Choreutics* (Von Laban, 1966) deals mostly with the concepts of *space* and *shape*: how different arrangements of our body in space have different expressive qualities. *The Mastery of Movement* (Laban & Ullmann, 1971) deals mostly with the concept of *effort* : How the style and flow of our movement is affective, as we shape our body.

Telerobotic mediation opens new modalities of shape and effort that are determined by the underlying robot structure, actuation and materials, rather than our body. Since we are interested in soft robotics and new materialities for robots, let us look at the difference in affordances between soft and rigid robotics. In the case of shape, soft robotics offer a clear advantage over rigid materials in their ability to exhibit curves (see fig. 5). Curves are undoubtedly more prominent in nature than linear structures. This is due to most fundamental properties of physics. First and foremost gravity, the force that governs all interactions between matter, causes matter to bend into spherical formations because only a sphere maintains the same distance from a center point. Moreover, according to the theory of general relativity, gravity is in itself is a curvature of space (Nichols et al., 2011) and that fact determines the basic dynamics of interaction between things. Second, the interconnectedness of nature, having it composed of a variety of atomic parts that interact with one another, induces non-linear system behaviors modeled after positive and negative feedback between parts (DeAngelis, Post, & Travis, 2012). When a positive feedback loop occurs, a process displays an exponential growth curve and when a negative feedback loop is active, we will see a logarithmic decay or a sinusoidal oscillation pattern.



Rudolf Laban divided the shape forms that the human body could take into four different categories that define general outline and intention of the pose (Crimmens, 2006): 1) Wall: a wide,flat extension of the body, 2) Ball: A curved and tucked form, 3) Pin: A narrow stretching of the body and 4) Twist: twisting the top half of the body. Out of those categories, the two latter forms are more relevant, and perhaps can only be achieved by soft robotic actuators. Although it is stated that different emotional interpretations to the forms could arise by different people in different times, it is apparent that soft actuators add additional modalities over rigid ones. The curved shapes, however, may also induce an unwanted eerie effect. While the human and mammalian spine is a curved spiral shape, it is a subtle one, imbued with vertebra. From afar the human body appears fairly linear. A completely smooth curve is more associated with invertebrates such as insects and worms. One must be able to find the right constraints once presented with a fully flexible material.

Curves are also prevalent when considering the pathways of movement, not only the final shape of the body. Laban distinguished between linear, direct pathways of movement and the curved, indirect pathways: “the straight line has a character of stillness, the bent line the character of movement. The curved line is oscillation, thus liable; it can be varied and differentiated…Strongly curved arcs appear to embody element of speed.” (as cited in Bishop et al., 2014, p. 63). The motion curve pertains to changes in speed and flow during movement. When expanded to the notion of effort, Laban was able to categorize the properties of movement into four categories: 1) Weight 2) Time 3) Space 4) Flow. Their properties are described in tbl. 1. Laban discriminates between two polarities of emotion: fighting and yielding. Reviewing the table, it is clear that rigid motor actuators such as servo and DC motors pertain to the expressions of fighting, while soft actuators are more associated with expressions of yielding. With strong enough force, it is possible to express a fiercer attitude using soft actuators, but is extremely hard to design flexible, gentle and fluid motion with rigid actuators. Because of their discrete, linear nature, one would have to increase the resolution of the motor to such a level where carefully crafted actuation appears fluid and continuous. In soft actuators, for example silicone based pneumatics, the actuation process in itself is nonlinear insofar as it depends on the dynamic properties of silicone and air pressure, and can be varied in a fluid manner using pressure regulation to express a range of emotions.

Table 1: Rudolf Laban’s motion factors of effort (adapted from Laban & Ullmann, 1971).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Motion factors | (fighting) | (yielding) | Objective function | Movement sensation |
| Weight | firm | gentle | Resistance (stong / weak) | Levity (light / heavy) |
| Time | sudden | sustained | Speed (quick / slow) | Duration (long / short) |
| Space | direct | flexible | Direction (straight / wavy) | Expansion (pilant / threadlike) |
| Flow | bound | free | Control (stopping / releasing) | Fluency (fluid / pausing) |

In addition to emotional expression, body language maintains a pivotal role in gathering attention during face to face conversations. It was shown that a number of visual cues form coordination between people’s attention and most of them happen on a subconscious level (Keating, 2017). According to Kendon (1990, p. 249), movement on the lower part of the body has the most influential role in capturing our attention. This is a significant finding insofar as most of today’s digital communication is done without any view on the lower part of the body. Other visual cues include culture-specific gestures and gazing. It seems plausible that such actions would be demonstrated more effectively in a physical space using telerobotics than with Skype-like communication. In particular, the action of gazing is not transmitted well through a screen when the subjects are mostly focused on the camera that is located in their local space. Keating noted that people in remote working environment had difficulties in achieving coordination and synchronization during video conferencing (Keating, 2017, p. 309). It is likely that even with telerobotics the lack of congruency between action, intention and speech would result in attention difficulties.

As mentioned previously, the intimacy of the intercorporeal experience is embedded in our cognition from childhood and it’s hard to imagine mediated modalities that could substitute for them. As Dreyfus writes: “Whatever hugs do to people, I’m quite sure tele-hugs won’t do it. Any act of intimacy mediated by any sort of prosthesis would surely be equally grotesque if not obscene” (Dreyfus, 2000). Professor Ruth Feldman has been researching hugs and other physical reciprocal behaviors, especially in regards to their synergy with the hormone Oxytocin. In a study involving relationship and conflict dialog, the significance of Oxytocin was clearly asserted: “individuals whose partners had higher OT showed greater empathy” (Schneiderman, Kanat-Maymon, Zagoory-Sharon, & Feldman, 2014). In another study, Feldman found significant correlation between Oxytocin levels and what she referred to as “couples’ interactive reciprocity” (Schneiderman, Zagoory-Sharon, Leckman, & Feldman, 2012). The findings were based on comparing Oxytocin levels with a quantitative measurement of reciprocity that is based on Feldman’s Coding Interactive Behavioral Manual or CIB (Feldman, 1998). The manual itself is unpublished, but one could make presumptions about the studied behaviors by inspecting their code names: (1) positive affect, (2) interpersonal focus, (3) affectionate touch, (4) dyadic reciprocity and (5) matching emotional state. The term “interpersonal focus” was defined by Feldman as “gaze synchrony”. It is plausible that certain primal and hormonal factors of dyadic interaction exist only within the shared mundane space of intercorporeality. Nevertheless, a more relaxed analysis of the aforementioned codes would identify factors such synchrony and reciprocity as building blocks of empathy. Thus, when considering modalities offered by mediating agents, their affordances should allow the interlocutors to synchronize their movements, expressions and gazes so that even though they do not share the same physical space, they still feel joined and reciprocal.

In her study of hugs in US families, Goodwin sheds more light on intimate intercorporeality, or “Haptic sociality” as she calls it (Goodwin, 2017). A hug in the United States, Goodwin articulates, is a “treated as a medium of exchange, something “needed” by a seeker of a hug, which can be reciprocated by the recipient of a request for a hug” (1992, p. 96). It can be used as an act of comfort, a congratulatory gesture or a reconciliation ritual after conflict. In its nature it is a joint orchestrated engagement that starts with the hug seeker stretching their arms forward and is reciprocated by the partner, or sometimes even rejected. What is certain is that it has a great effect over our sociality; our social cognition and the perception of ourselves in relation to others. We witness deep social meanings starting from the slightest physical gestures such as handshakes to the most extreme ones such as sexual encounter - perhaps the cusp of the intertwining between social relations and physical contact. According to research by Birnbaum et al (Birnbaum, Reis, Mikulincer, Gillath, & Orpaz, 2006), sex and sexual fantasies often express our deepest and inner social desires: social avoidance would lead to a more aggressive sex for an empowerment of the self while social anxiety leads to submissive sex in search of order in chaos. For the production of a mediating intercorporeality, we should consider placing an emphasis on reciprocity and exchange. An intercorporeal physical interaction should strive to be an active sequence of reciprocating actions between the conversing partners and not a mere physical force exerted in a one-sided action. The interaction should then try to stay grounded, holding into the incarnated logos of the controllers; refraining from sliding into the realm of fantasies and desires that are reified into the physical avatar.

1. http://www.aljazeera.com/news/2016/02/netanyahu-jordan-border-wall-predators-160210055942587.html [↑](#footnote-ref-2)