"I/Magnet" Association: How Do People with Magnet Implants Signify Their New Experience

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Ассоциация «Я/магнит»: как люди с магнитными имплантами описывают свой новый опыт

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Резюме:

На основе самоотчётов людей с магнитными имплантами в пальцах, я ищу ответ на два сопряжённых вопроса: «Как технологически модифицированные люди обозначают свой новый опыт?» и «Как именно мы, не-модифицированные читатели, способны помыслить этот опыт»? Ответ на первый вопрос я начинаю с рассмотрения биосемиотики: в ней исследуется укоренённость перцептивных знаков в морфологии организма. С одной стороны, магнит действительно становится частью телесной схемы человека, с другой — в отличие от большинства живых организмов, человек может произвольно варьировать знаки. Теоретическая экспликация отношения между знаками, человеческим телом и технологиями приводит меня к феноменологии восприятия М. Мерло-Понти, на основе работ которого Д. Айди провел феноменологический анализ 4 режимов технологической медиаций внутри корреляции «Я-Мир». Его схема была расширена П.-П. Вербиком, который добавил в этот список медиацию типа «киборг». Во второй части статьи я применяю словарь материальной семиотики для анализа ассоциации «Я/магнит». Я разделяю цитаты МИ-агентов на несколько этапов существования рассматриваемой ассоциации: возникновение; взаимодействие с постоянными магнитами; взаимодействие с электромагнитными устройствами; обучение через других; актуальные неожиданные ассоциации; смыслообразование; новые риски разрушения ассоциаций; нормализация. В заключение я отвечаю на второй исходный вопрос о нашей (читателей) способности помыслить опыт жизни с магнитным имплантом. Я обращаясь к подходу «перцептивных знаковых систем» Л. Барсалоу, с помощью которого соотношу синестезию МИ-агентов и семиозис, преобразующий поле смысла для немодифицированного человека.

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"I/Magnet" Association: How Do People with Magnet Implants Signify Their New Experience

Abstract:
Based on self-reports of people with magnet implants, I investigate a pair of correlational questions: "How do technologically modified humans signify their new experience?" and "How do we, non-modified readers, become able to conceive it?". In answering the first question I start with biosemiotics. It considers signs being embedded in the morphology of an organism. On the one side, a magnet becomes a part of a human morphology and bodily schema; on the other — unlike most living organisms, humans can vary signs arbitrarily. I switch the theoretical exposition of the relation between signs, the human body, and technology to Merleau-Ponty's phenomenology of perception, based on whose work Ihde conducted a phenomenological analysis of 4 regimes of technological mediations within the "I — World" correlation. His scheme was extended by Verbeek, who adds "cyborg relation" to the list. In the second part of the paper, I apply a vocabulary of material semiotics to the analysis of the "I/magnet" association. I separate quotes of MI-agents into several stages of existence of the association in question: emergence; interactions with constant magnets; interactions with electromagnetic devices; learning through others; actual non-expected associations; sense-formation; new risks of disruption of associations; normalization. I conclude with an attempt to answer 2nd initial question, about our (readers) conceivability by appealing to Barsalou's "perceptual symbol systems" approach, with the help of which I correlate synesthesia of MI-agents and semiosis — which transforms the field of meaning for a non-modified person.

Keywords: technological modification, magnet implants, semiosis, biosemiotics, material semiotics, phenomenology of technology, cyborg intentionality, Ihde

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Part I: Sign formation, technology and a living body

I would like to start by asking a pair of correlational questions: "How do technologically modified humans signify their new experience?" — and "How do we, non-modified readers, become able to conceive it?" From the perspective of transhumanism, I am interested in the class of modifications that go beyond psychophysiological limitations defining a human (see discussion and examples in [Gray, Figueroa-Sarriera and Mentor 2021]). I find the most promising topic to be "radical technomodifications", which are thought of as a process of transforming humans into posthuman entities. Unfortunately, all examples of the latter remain highly speculative nowadays; for that reason, at first, I have decided to focus on an empirically observable set of modifications, mostly done by volunteers and DIY-biohackers — implantation of a magnet in their bodies, mainly fingers. Besides other factors, my intention to start the investigation of magnet implants (MI) in this paper is due to their structural simplicity: if the chosen method of description works for reports of MI-agents, it might be extrapolated on other, more complex, and nuanced cases.

Magnetoreception is not a problem in and of itself: self-reports of people with magnets are what they are. The problem is: how can we conceive the phenomenal specificity of a cyborg, in Haraway terms?

On the one hand, we have a vocabulary of phenomenology — however, it would rather reabsorb the activity of technological elements in the descriptions into a human-centered horizon of meanings (since even theoretical concepts of electromagnetism are intersubjectively developed).

On the other hand, we have a vocabulary of material semiotics, which is sensitive to the activity of hybrid human-machine entities and heterogeneous assemblages, associations in a broader sense — however, it was not invented for capturing phenomenal experience as such, otherwise, it would risk bringing back human/non-human division by prioritizing pole of subjectivity (on which the bearer of experience is supposedly localized).

This paper is a theoretical work with empirical illustrations, whose aim is to establish a bridge between material semiotics and the phenomenology of technology and, especially, to show how material semiotics could be applied to the domain of experience, which hasn't been its primary target[1]. By analyzing self-reports of I/magnet associations,

1 I would like to mention a resonating paper on anthropology of technological bodymodificatios by J. Kadlecova [2020]. She investigates the subculture of body-hacking and the complexities in the relationship between humans and the artificial body parts they install in themselves, also by referring to the works of J.

I attempt to make visible a pattern of a *dynamic entanglement* between human and non-human entities constituting one's body and its action-perception world.

While we are discussing experience here, it can't be lived through due to double discontinuity — between (1) phenomenal givenness for MI-agents and their self-descriptions, and between (2) their self-descriptions and *our* bodily experience. That put special emphasis on the problem of signification as a result of sign formation: how do new structures of meaning arise through new patterns of a magnet activity? We will observe that (1) is happening not via the invention of novel words and phrases but through contextual repurposing of already existing ones. Discontinuity (2) is a more nuanced one since it requires a certain reflexive turn: we will carry it out in the Conclusion part.

Introduction to Biosemiotics

We begin our journey in the search of semiosis from the perspective of another related domain — biosemiotics (the field of knowledge about signs and communication in living systems), since it roots the origin of meaning in the biology of an organism, its bodily structure.

Biosemiotics formed in the middle of the 20th century, supported by other emerging disciplines such as ethology and zoosemiotics [Emmeche and Kull, 2011]. Its formation raised a problem of revision of established relations between a *sign*, a *meaning*, and a *referent*. The main difference with signification in human language in biosemiotics is that the sign-meaning relationship is thought of as embedded into the morphology of an organism. At the price of non-arbitrary signification plants and animals gain a very stable and survival-relevant view of their environment.

> *For example, a snake recognizes the shapes of warm-blooded mammals in grass via infrared vision. Depending on their sizes, it distinguishes between instances of danger and prey. Small infrared glowing bodies are prey for a snake, this is their meaning in a snake's perception-action world: though it can't be changed at the snake's will, on the other side, a snake needs not to think twice about a proper action once the infrared moving entity appears nearby.*

This logic of embeddedness would be true for a plethora of living organisms with magnetoreception: molluscs, sharks, stingrays, migrating birds, some plants (pea), insects (fruit fly, honey bee), etc.

Law and B. Latour on material semiotics. I give a more explicit discussion about the role of the material semiotics in descriptions of a technological modification at the beginning of Part II.

Their ability to detect and respond to Earth's magnetic field enables them to navigate in space more efficiently, even though they can't vary their perceptive patterns and adapt to noise in the form of radio frequencies produced by humans.

Worth to mention: since the 2010s when I first got intrigued by the topic of MI [Bykov, 2017], magnetoreception has been discovered in humans as well. It is supposed to be involuntary, as in most animals, and is realized on a molecular level resulting in changes in alpha-waves of the brain [Wang *et al.*, 2019]. Various mechanisms have been proposed to explain these phenomena, one of which involves the quantum effects of cryptochrome protein in the eye; recent empirical research approves the existence of magnetoreception in humans [Chae *et al.*, 2022]. Besides being positively surprised by this sudden paradigm shift of a view of our natural senses, I still see the problem of the conceivability of technomodified experience raised in the beginning relevant, since the perception of magnetic fields in cited papers is subconscious and cannot be reflectively thematized.

However, since rare-earth magnets are not biologically pre-installed for Homo Sapiens, we have an inevitable complexification of our perception-action world with cultural patterns and/or scientific theories[1]. What separates case with MI from its innate counterparts in animals is the planned & non-adaptational character of MI-augmentation: hundreds of people agreed to cut their fingers to be merged with artificially created objects mainly out of *curiosity*[2], not for survival in its ecological niche or another pragmatic purpose.

Phenomenology of the body and "cyborg intentionality"

One way to deal with the problem of the signification of magnetoreception requires an appeal to the resources of phenomenology since a lot of experience-sensitive concepts have been developed within this approach. After the establishment of the phenomenological methodology as a whole by E. Husserl, the first extended analysis of perception and the role of a living body in it has been conducted by M. Merleau-Ponty:

1 In a paper "Umwelt extended" [Kadlecova and Krbec, 2020] authors formulate their critical arguments of representationalism in anthropology and explore the Umwelt-analysis (models of experience of living organisms, created by J. von Uexkull) to enlarge the explicative repertoire of social sciences. I believe the reference to Uexkull here is extremely profound, since the *bodily* alteration is our starting point; nevertheless, its applicability is limited by broader biosemiotical considerations.

2 According to Table C-6 from [Harris, 2015], where respondents have been asked about their motivation.

he formed the ground for further discussions in the "Phenomenology of Perception". In particular, he was very precise in his descriptions of changes in bodily experiences due to interaction with various devices. Besides the most well-known one (the role of a cane for a blind person), there are at least two other examples in his main work:
a typewriter

> When the typist performs the necessary movements on the typewriter, these movements are governed by an intention, but the intention does not posit the keys as objective locations. It is literally true that the subject who learns to type incorporates the key-bank space into his bodily space [Merleau-Ponty, 2002: 167]

and an organ (musical instrument)

> He sits on the seat, works the pedals, pulls out the stops, gets the measure of the instrument with his body, incorporates within himself the relevant directions and dimensions, settles into the organ as one settles into a house. He does not learn objective spatial positions for each stop and pedal, nor does he commit them to 'memory'. [ibid, 168]

Notice that a process of "incorporation" (in-*corpo*ration) is mentioned in both cases. It depends on the *material* from which the device is made — organ tubes made from wood and from steel would produce different sounds, — and their *structural composition* — a typewriter would be operated differently, be it a mechanical typewriter or a keyboard of a laptop. Therefore, we might assume that during the process of in-corporation at least some properties of these devices directly affect newly emerged skill-related sensations. And, since human bodies have been connected with thousands of devices throughout our cultural history, perspectives of taking these "connections" into phenomenological account open up widely.

Nevertheless, Merleau-Ponty doesn't continue the exploration of these perspectives. From his viewpoint, technologies are substantial but non-essential aspect of a human being. They are interchangeable and short-timed in comparison with the duration of our lives. And, since the existence of a living body primarily constitutes our existence, Merleau-Ponty is mainly focused on analyzing the life-long interconnectedness of sensations rather than on their technologically induced derivatives.

For example, according to him,

> "I do not translate the 'data of touch' into the language of seeing' or *vice versa* — I do not bring together one by one the parts of my body; this translation and this unification are performed once and for all within me: they are my body, itself. [ibid, 173]

But in the case of technological modification of a body, exactly the opposite happens. Patients with anti-epileptic nervous stimulation devices, as nurses wearing exoskeletons [Katila and Turja, 2021] find themselves in a condition of temporary "bodily uncertainty". Newly obtained parts of their bodies are brought into question, needing translation and reflexive shifts, for they hadn't been known in any previous experiences.

Even though the topic of technological modification of a body hasn't been covered extensively by Merleau-Ponty himself, his writings have been elaborated later by two phenomenologists of technology, D. Ihde and P.-P. Verbeek. The latter came the closest to the phenomenological description of a cyborg than anyone else, while the former moved from solely phenomenological method and was looking for productive interbreeding between it and the actor-network theory, as well as material engagement theory (see [Ihde and Malafouris, 2019]).

Ihde has been interested in the phenomenon of a multistability when the same perceptual data can result in different phenomenal givenness (as in the Necker cube or face/vase illusion). He made a step further and apply this intuition of multistability to technological artifacts in our lifeworld: technology in itself does not constitute the actual way in which it will be used and how they alter the "I — World" correlation (see his book "Technology and Lifeworld" [1990]).

There are 4 main regimes of technologically mediated "I — World" correlation distinguished by D. Ihde:

Embodiment	(I — Technology) ⇁ World	Technologies can be embodied by their users, establishing a relationship between humans and their world. *Example*: When looking through a pair of glasses, the glasses are not noticed explicitly but are "incorporated"; they become extensions of the human body.
Alterity	I ⇁ Technology (-World)	Technologies can be the terminus of our experience — when human beings interact with them and leave the world in the background of this interaction. *Examples:* human-robot interactions, getting money from an ATM, or operating a machine.
Hermeneutic	I ⇁ (Technology — World)	Technologies provide representations of reality, which need interpretation to constitute a "perception". *Example*: fMRI scans, scale of a thermometer.

Background	I (-Technology — World)	Technologies are not experienced directly but rather create a context for our perceptions. *Examples*: night city electricity, automatic switching on and off of the refrigerator, Internet of Things in general.

The scheme needs only one addition to be brought back directly into the discussion of magnet implants, and this addition has been made by P.-P. Verbeek — he argues in favour of including *cyborg relation* of technological mediation in our picture:

Cyborg (I /Technology) ⇁ World

According to Verbeek,

> The intentionality involved in the embodiment relation is not entirely human either [like being directed at each other through a mobile phone, or hear through a hearing aid] ... But in these embodiment relations, a distinction can still be made between the human and the technological "share" in the mediated experience, while this is not possible in cyborg relations, where humans and technology form a new experiencing entity. [Verbeek, 2008: 391]

We might go even further and state that, since "a new experiencing entity" is formed,

(I /Technology) = I' => World'

Or, in phenomenological terms, this relation brings to life a transformed fundamental correlation: the world as given to a cyborg would be a somehow different one. But *how* different, exactly? Merleau-Ponty, Ihde, and Verbeek provided us with the general structure for understanding, and yet we don't have a proper vocabulary to describe the activity of a magnet implant without reducing it to the Maxwell laws. At the very pinnacle of the phenomenology of technology, we become ready to put to the test a framework of material semiotics.

In the same vein, Verbeek continues to specify yet another type of technological mediation —

Composite intentionality I ⇁ (Technology ⇁ World)

when human intentionality is directed to the world through the way in which technology is directed to the world [Verbeek 2008: 393]. In our case, the implant is so structurally simple that "technological intentionality"

is reduced to "material intentionality", that is, to the intrinsic activity of the magnet itself. And exactly here is the point where material semiotics could function as a bridge, in order not to conflate phenomenological vocabulary of intentionality with the description of magnets' "orientedness toward the world". As an actor, a magnet is inherently interested in others of its kind, distributed in our environment. The term "interest" is understood here in a sense of a non-human agency; it doesn't imply the subjectivity of a magnet or hidden panpsychism — rather, the language of "interest" emphasize the trace of actions that a magnet creates by merely existing in the world. This 'symmetrical vocabulary' has been widely adopted by "middle period" ANT (1980-1990s) and can be seen in use in classical paper [Callon 1984] describing the case of (failed) domestication of scallops and fishermen by marine scientists.

In the last section of Chapter III of "Reassembling the Social" Latour made a somehow hidden but, in my opinion, very influential footnote #67:

> In spite of many efforts, especially in Don Ihde and Evan Selinger (2003), *Chasing Technoscience. Matrix for Materiality*, to reconcile ANT and phenomenology, the gaps between the two lines of interest remain too wide because of the excessive stress given by phenomenologists to the human sources of agency. ... This does not mean that we should deprive ourselves of the rich descriptive vocabulary of phenomenology, simply that we have to extend it to 'non-intentional' entities. [2005: 61]

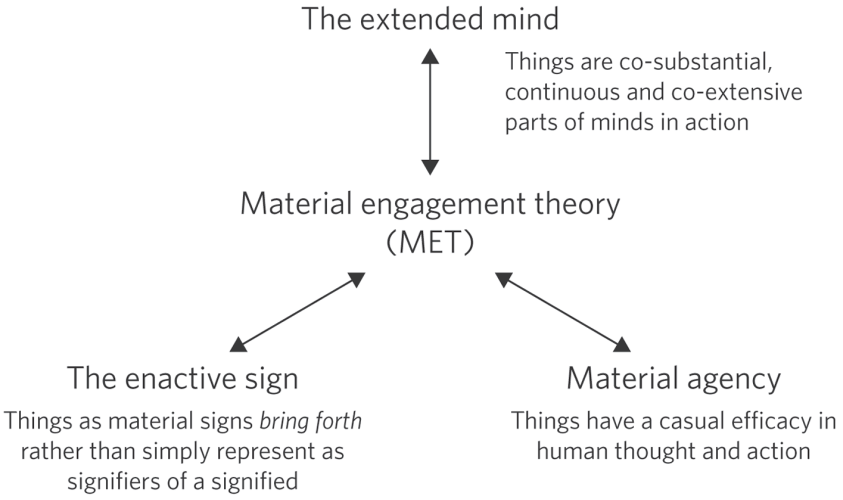
It is remarkable that standing apart from phenomenological tradition across most of his publications, Latour refers to Ihde as one of the rarest authors who invested his efforts in an attempt to merge it with ANT. The ending sentence, however, seemingly promising, is also a deceiving one: phenomenological vocabulary can't be "simply" extended to 'non-intentional' entities since the former has been constructed *specifically* to prevent such extension from happening. It doesn't mean, on the contrary, that *any* form of mutual enrichment is prohibited: rather, as we might add using Latour's own phrasing, such extension would be inevitably (and conceptually) costly and sparse in comparison with overall phenomenological repertoire. I think that material semiotics — in the case of technomodification — and phenomenology of technology share some structural similarities regarding the objects of their interest, and this could be illustrated with the help of 3rd theoretical intermediary.

Part II: "I/magnet" association as seen by material semiotics

Ihde's own position concerning phenomenology was quite often called 'postphenomenological' by peers since his reshaping of problematization

within the field sometimes lead him outside the field. He himself didn't accept the naming, however, he explicitly agreed with certain structural weaknesses of phenomenology — the one of which was its inability to incorporate non-human sources of agency. Recently Ihde discussed this and some other issues with Malafouris, author of "material engagement theory". What does "material engagement" mean? When looking under the surface of the title, we shouldn't be surprised to see a certain commonality, a fleur of resemblance:

> The distinctive feature of the material engagement approach is the commitment to a view of thinking as a process that is distributed, enacted and situated, as well as assembled, from a variety of non-localisable mental resources spanning the boundaries of the individual brain and body. Material engagement theory as an explanatory path is based on three interrelated working hypotheses, which can be summarised as follows ...



[Malafouris 2019: 196]

Putting aside his primary reference to the domain of cognitive sciences, we might see that 2 of 3 of his hypotheses — namely, Material agency and The enactive sign — have been already implemented by material semiotics, which lay at the core of ANT. And each of these two hypotheses is vividly exemplified by the case of magnet implants:

1. It shares strong similarities with biosemiotics in the way that the enactive aspect of signification is *embedded* into a magnet (i.e., it doesn't merely indicate "there's an active electromagnet nearby", it starts to vibrate or even pushes one's finger in that direction).
2. Once the implantation has happened, a magnet occupies certain areas of action-perception *anticipation space of possibilities* of its human bearer (see quotes).

I have to mention that I'm not specifically interested in the work of Malafouris here, however, his scheme makes it easier to delineate which particular components of material semiotics would guide my theoretical endeavor. If we are reframing our understanding of the case in this manner, we have to reformulate our initial interest from Part I: it's not the topic of a general structure of experience we should depart from to make its particular model — rather, we shall follow an *I/magnet association* through different stages of its existence. Once the quotes of MI-agents are arranged accordingly, model of experience in question would emerge in the end.

The table below illustrates how different topics (around which MI-responses are centered) are correlated with these stages of existence:

1	*The emergence* of an association	"I" associating a "magnet"
2	*Interaction with*	
2.1	the *same actor* as the newly associated one (I/magnet — magnets)	Other constant magnets and magnetic metals
2.2	*different actors* belonging to the *same domain* (I/magnet — electromagnets)	Objects with changing magnetic field — electromagnets (EM-devices and their EM-fields)
2.3	other I/magnet associations (actual and projective)	Learning through comparisons with other MI-agents
2.4	unexpected and phenomenally new actors in the world	Actual non-anticipated interactions
3	Deepening of I/magnet *integration*	From perceptions to sense-formation
4	*Disintegration* of:	New kinds of risks due to disruption of associations
4.1	*Other* material *associations* because of I/magnet activity	— Disruption in associations of external devices
4.2	*I/magnet* association *itself* (with 3 subtypes)	—Break of "I/magnet" association itself:
5	*Phenomenal disappearance* of an I/magnet association	Normalization / Fading away

1. "I" associating a "magnet"

When do we begin to talk about the association as formed — when does it *emerge*? Immediately after the surgical operation? On the part of a magnet, nothing has changed besides a slight decrease in its field due to skin and cover layers. On the part of a human, though, a spike of self-awareness about magnetic sensations is extremely important as a sign that association does actually exist.

> For some reason, I woke up one morning and I felt a magnetic pull from my AirPods. I've felt it before but this was different. It wasn't like before where my brain consciously new that it was a magnet moving in my finger, but it felt like an indescribable new sense. I didn't realize it until a few seconds after, but that was the moment it "clicked" in my brain[1]. [II: 2]

Shift from "I" to "I/magnet" usually doesn't happen from participating in a drastically new activity, for it would require MI-agent to act as an integrated whole already. It is more something like a flare, a burst of novelty through mundane patterns:

> The first time I realized my implant was reacting to an EM field was a power drill. Normally the drill vents air out the sides so I thought it was just exhaust on my finger but I quickly realized my finger was not near the exhaust and the "windy" sensation was coming from the inside of my finger. [II: 5]

Quite in line with a quote from Merleau-Ponty, incorporation of a magnet into a human body means that an additional reflexive arc is no longer needed for "I/magnet" association:

> The first time I used it to sense magnetic fields without even thinking about it, because it just felt so natural to sense magnetism. It was honestly a life changing moment. [II: 3]

2.1 Other constant magnets and magnetic metals

The initial unfolding of an "I/magnet" association toward the world (World') can be done in a form of a simple extrapolation: how would *other constant magnets* interact with the magnet inside a finger? I focus on this subtype of actors at first because the implantation itself has selected them among others — and they became very discernable:

1 Grammar and punctuation of all quoted passages are preserved from their original sources.

> it feels like a smooth pressure. Imagine running your hand slowly through lukewarm water, and brushing your finger across the top of a large invisible marshmallow. [I: Dillow 2004]

Now we can extend the repertoire and add some other entities with constant properties, like metals:

> I can also differentiate between magnetic and non-magnetic materials, and even determine the thickness of sheet steel based on how much pressure I feel from the implant when I touch my finger to the steel. [III: C-8]

A polarity, the very specific property of a magnet as such, becomes sensitively revealed for MI-agent:

> I implanted 2 magnets in the side of my hand one with the north out one with the south out. They ... holds their polarity in place. So yes I can feel poles. I can feel a push on my front magnet and a pull on the back on and I know that is north and vise versa. [II: 4]

Even though "I/magnet" association doesn't necessarily start its perceptual journey exactly with constant magnets, they provide good scaffoldings for us to model more complex sensations.

2.2 Objects with changing magnetic field — electromagnets (EM-devices and their EM-fields)

The category of constant magnets pales in contrast with the abundance of the ones whose field changes over time — electromagnets.

> Metal and magnets you feel a pull until you get too close and start to feel a painful pinch (same with powerful EM fields, which feel like a painful pinch/push x times a second). [III: C-8]

Most of our electronic devices are built in a way that generates surrounding electromagnetic fields. So, it won't be an exaggeration to say that, once accustomed to discerning MI-sensation, "I/magnet" association faces a tsunami, an avalanche of new entities, as well as of old ones perceived anew:

> Things like power cord transformers, microwaves, and laptop fans became interactive in a whole new way. Each object has its own unique field, with different strength and "texture." I started holding my finger over almost everything that I could, getting a feeling for each object's invisible reach. [I: Berg 2012]

Driven by MI-agents desire for new sensations, the list continues so extensively that I decided to name mainly the objects they interact with:

- xray at dentists
- cooker
- pencil sharpener
- some plugs
- magnet in laptop's screen
- clocking in scanner at work
- transformers [also halogen ones]
- electric hair clippers
- hard drives (I feel them spin)
- electric motors (i.e. in a desk-fan),
- laptop power converters feel almost pleasant
- motion detector unit of automated pissoirs.
- when a cashier scans a product and breaks the RFID tag on it; it feels like a sharp burst of field. [III: C-8]

Once the new experiencing entity is filled with novelty, it almost inevitably starts to juxtapose sensations to make more sense of them. In a manner of a magnetic gourmet, MI-agent emphasizes nuances and subtle differences of selected EM-fields:

> My favorite feeling comes from an automotive battery charger I own. High amperage DC voltage has a very "chunky" feeling, almost like being mildly electrocuted, as opposed to the field from an electric motor, which feels more "fuzzy", like a warm, fast-moving wind across the skin. [ibid]

2.3 Learning through comparisons with Other MI-agents

Nevertheless, the formation of "I/magnet" as an experiencing agent doesn't take place in isolation. It doesn't resemble a Condilliac statue — quite the opposite: it was filled with projections of Others at the very beginning when it was a single "I". Only by sharing expectations with the audience and learning to expect something based on the stories of others you form a relatively coherent anticipation of a magnetic experience yet to be felt[1].

> I feel microwave ovens and ventilators, but no luck with laptop power packs so far. after talking to other people with magnetic implants, I think I am a little less sensitive to magnetic fields than most of them, but I'm not sure. [III: C-8]

Once the "I/magnet" association is formed, it also transforms one's Theory of Mind — embodied empathy starts to extend its limits,

1 All quotes from Biohacker Forum in the paper should be considered this way too.

> What I also found was as I watched videos on YouTube relating to magnets (such as Brainiac75), I was unconsciously "feeling" what the YouTuber would feel when handling a magnet in the same way you can "feel" watching someone get kicked in the groin. [II: 2]

— as well as, on the contrary, it also draws borders between MI-agents and magnetically non-sensitive people. However, there still is an unexpected way to share at least some of the bodily perceptions:

> magnetic fields ... [of] welding machines causes enough movement for other people who happens to be touching my hand at that time to feel it as well. [II: 1]

2.4 Actual non-anticipated interactions

One of the most remarkable aspects of the concept of an 'actor' from ANT's version's material semiotics is its *actual* uniqueness, revealed in the form of *unpredictable interactions* it undergoes [Latour 2005: 143]. I collected a few quotes here in order to pause in awe — each of them demonstrates a way of using magnets that simply goes beyond the initial expectation on a part of a human agent, because the magnet as an actor, is thrown in a flow of real-life events, exposes its new situational properties.

For example, it may turn into a hidden oasis of half-sexual pleasure too:

> My most favorite sensation is when I use opposite poles of a magnet to make my implant flip over. That's a totally bizarre and almost erotic sensation ... I've considered asking Steve to give me some magnetic genital beads or designing some custom magnetic jewelry for my apadravya so I can experiment with the use of electromagnets for erotic stimulation[1]. [III: C-8]

After magnetoreception becomes a coherently functioning sense, MI-agent can develop a related *skill* on its basis:

> [I work on computers] My clients computer would not boot, and they diagnosed a dead hard drive and stated they didn't even think it was spinning. By hovering my hand over the laptop, I was able to feel the laptop spinning, and spinning at what I believed to be a normal speed. That allowed me to skip some of the troubleshooting process and diagnose/fix the issue quicker. [ibid]

1 Perception of the same event can vary drastically though: "The magnet flips position fairly often and it's become a bit of a tic to push it back down" [III: C-7]

I personally feel impressed by the story of Berg's discovery. One of its most striking aspects is that the source of the magnetic signal hasn't been checked — all we have is a subtle yet intriguing chain of "I/magnet" conclusions:

> The best part of having the magnet implant was discovering invisible magnetic fields when I wasn't actually looking. The first experience I had with this was walking through the intersection of Broadway and Bleecker in Manhattan. I passed through this intersection a few times before realizing that my finger would tingle at a certain spot. After paying a bit more attention, I realized that I was feeling something underground. At first, I assumed it was a subway car, but later came to the conclusion that it was most likely the subway power generator, or the giant fan that was cooling these generators. After noticing these underground waves at Broadway and Bleecker, I began feeling them all over Manhattan. [I: Berg 2012]

3. From perceptions to sense-formation

Finally, in-corporation reaches a phase when "I/magnet" can theorize about its emerged sense as a whole; integration between the elements has only deepened after all the interactions.

> Most objects feel like a vibration or a buzz emanating from my finger tip. These vibrations can vary in frequency and amplitude [III: C-8]

As was exceptionally vividly shown by M. Farina [2013: 651-652] in his paper "Neither Touch nor Vision", even though sensing through Sensory Substitution Devices (SSD) is modulated through already existing sensory modalities[1], SSD induces synesthesia in a subject. I think it could be better understood with the help of the idea of *a multidimensional manifold of experience*. Synesthesia signifies the process of plasticity which takes place at the very root of a manifold, where senses are not distinguished from one another, where they still exist in some sort of pluripotency. That is, in part, why respondents tend to compare MI-induced sense with some other they already have:

> I can detect different frequencies in the magnetic fields. … The sensation is rather intuitive, and exploring a magnetic field is not unlike trying to identify an object with your eyes closed. [I: Dillow 2004]

> The way it becomes a separate sense. I often describe it as the feeling is the same thing to *touch* as *taste* is to *smell* (kinda related but also separate) [II: 3]

1 In his case — the substitution of vision through audial channels with a vOICE device for visually disabled people.

> It feels like tingling buzz, except as your finger moves through space, it is mapped to a three dimensional sense. ... With a lot of fields going at once the effect can be compared to music [III: C-8]

The concepts involved in the answers become the most abstract in comparison with all the other sections we have observed so far. That is done so because MI-agent tries to focus on the aspects of the experience in question which would be discernable in every MI-related experience:

> My sensitivity has increased which allows me to not only feel the wave, but feel the "shape" of the wave. Microwaves give off a chaotic wave, but things like computer fans give off a nice dome/donut shape. It is very hard for me to explain what it feels like. The sensation is similar to a "buzzing" like when one of your extremities falls asleep, but I get more information such as intensity, "shape", and direction of the wave. [ibid]

4. New kinds of risks due to disruption of associations

In previous sections, we have witnessed only the "constructive gains" of "I/magnet" association; these gains come with principally new dangers of an association being disintegrated. However, before disintegration itself comes the pain which indicates this new risk:

> [magnet] was apparently placed too much over the bone, so would get painful whenever there was pressure on the fingertip. Since I like to lift heavy weights, it became very annoying- I would have to keep that finger uninvolved from dumbbells/barbells/plates as much as possible [II: 3]

For similar reasons, having a magnet in your finger would partially prevent you from:

- starting bouldering as a hobby
- opening jars
- playing bass guitar
- catching a baseball (in a mitt) [III: C-7]

Problems might appear both on the pole of "I/magnet" association itself, and on the pole of association it interacts with: I'll briefly illustrate both of them.

4.1 — Disruption in associations of external devices

It has to be said that MI-community members had anticipated most of the potential troubles with having a magnetic body part interacting with most electronic devices. Nevertheless, some everyday objects with

a specific composition turned out to be too magnetically responsive:

> The only inconvenience I have had so far is demagnetizing a "player card" at a casino [III: C-7]

> I can't carry hotel keycards in my right pocket, because I occasionally demagnetize them [I: Robertson 2014].

Disruption doesn't mean full disintegration — it might also lead to non-desirable functionality:

> the only negative impact of the magnet is that my phone uses a magnetic sensor to identify when it's docked so if I touch a specific area on the back of the phone it will wake up and think it's on a dock [III: C-7]

4.2 —Break of "I/magnet" association itself:

The disintegration of "I/magnet" could fall into 1 of 3 main scenarios:

- [Magnet becomes **discharged**]

Even constant magnets are not truly constant. Over time an object becomes demagnetized as a whole when its basic elements become magnetically decoherent, and MI-agents are sensitive to this slow decline.

> Around a year ago, a distinctive "bump" of magnetic repellant on my MacBook keyboard started shrinking, until it was little more than a weak vibration. … Today, magnetic sensation has gone from a basic feeling to something I'm surprised to feel on rare occasions [I: Robertson 2017]

- [Magnet is **torn apart**]

One of the most often advised "what to avoid" in MI-community are fMRI scanners — they represent one of the most brutal and forceful methods of removal of a magnet.

> maybe 3 to 5 feet away and my magnet started acting up. Flipping about and pulling on the skin; I even tried to proceed by holding it down, but I felt a pinching and burning sensation and the MRI was stopped [III: C-9]

- [Bodily **interface of a finge**r (the '/ ' in "I/magnet") is endangered]

After researching Biohacking Forum branch on MI, I can estimate that approximately ~ ⅓ — ¼ of all posts there were discussing measures of protection and necessary action one should take to heal the tiny piece of

skin which covers the newly obtained magnet. This was one of the main topics in [Harris 2015] questionary too:

> About two weeks after implanting the magnet I found it was probably too close to the surface of my skin for any long-term use, so I removed it before it had fully healed. [III: C-7]

5. Normalization / Fading away

Far before the magnet would lose its magnetic properties, though, *normalization* happens. I separate it from the stage of disintegration in the same logic in which surgical injection of a magnet is not the moment when an association is formed. *Normalization* exemplifies, so to say, 'action-perception homeostasis' of an implant with a modified person:

> Before I implanted, I never thought it would become a normal sensation. I always thought it would be a "special" feeling that would always consciously register. I was wrong. ... I'll even find myself subconsciously investigating magnetic fields while bored (like the locations of all the magnetic fields on my laptop) without much of a conscious decision. [II: 2]

In a sense, a magnet in "I/magnet" association encapsulates certain temporal projections of its use. So, an important part of the "fading away" process is the absence of its involvement in the lifeworld of MI-agent:

> It's just not an integral part of my life the way the magnet is. ... I knew beforehand that its value would be determined by how well other things support it. ... It's also a strange reminder that someday, small parts of me will be obsolete. [I: Robertson 2014]

Conclusions

My attempt to separate self-reports of people with magnet implants into groups based on different stages of existence of "I/magnet" associations should not be considered universally applicable — or, to be precise, mentioned phases are unequal in their universality: the latter substantially depends on the characteristics of a modifying technology. For example, if we switch to the case of people with artificial heart implants, we won't specify as many subgroups of interactions with external associations as in the case with magnets since heart implants interact a lot with an assemblage of organs and inner body systems to function properly. If, once again, we switch to the case of invasive neurointerfaces, we would need to subdivide different scenarios of disintegration: they could stop being a part of an association because

of program errors, material damage, or neurodegeneration in the contact area, etc. It might be useful to think of stage-differentiation as a navigation tool that helps structure self-reports of MI-agents: seemingly ontological, this differentiation serves epistemological purposes of reaching a conceivability of magnetoreception.

Stage 1 and the difference between stages 4 and 5 are probably the most typical among others: they point out that association emerges and, conversely, fragments not in the very same moment when technological devices are injected into (removed from) the human body. As shown in "Fading away", you can even live with the charged magnet in a finger without consciously noticing it. Stage 2 is also typical, but only on a general level implied by the notion of an *act*ant — whatever I/'X' association would be, it would inevitably inter*act* in a new manner with other entities in the world, forming its essence in the process. It could be one of its kind, state-of-art technological endeavor (in which case there would be no Others to compare with, diminishing stage 2.3), or it could be a part of an ever-growing community, as in the case with cochlear implants nowadays. I also insist on the importance of being sensitive to non-expected associations (stage 2.4) since one of the core intuitions of the ANT version of material semiotics is that none of the actants is fully predictable in its actual interaction with its surroundings. Nor engineers, nor scientists, nor technomodificants themselves couldn't anticipate the overall trajectory an emerged association would follow. I don't want to trivialize this intuition, but we should follow the path of surprises for it is the way to not allow our theoretical assumption to replace discoveries made by informants. In the case of magnets, stage 3 (integration) emphasized a more nuanced magnetoreception, however, if the technology in question would be less centered on perception, integration between elements of an association might take another form.

Once again: when I appeal to the resources of material semiotics in this paper, I see them not as a theoretically purified set of conceptual problems but rather as a polyvalent toolbox which might be useful for other disciplines. In the case of magnet implants in particular, material semiotics helps to organize self-reports in a way that would expose the phenomenal perspective of an "I/magnet" association, a 'new experiencing entity' in Verbeek's terms. Comparison of Malafouris' material engagement theory with material semiotics highlights theoretical assumptions of the latter which it shares with the phenomenology of technology, so "stages of existence of an association" could be in principle productively redescribed using the language of 'cyborg intentionality'. I think the anthropology of technology in general, as shown in [Kadlecova 2020], would benefit from adopting certain symmetry in descriptions of technological modifications of a body.

At the end of this paper, I'd like to turn back to the 2nd initial question from the beginning. Let's take a self-reflexive turn, a closer look at how these descriptions function upon us, non-modified readers.

Even though we are still insensitive to magnetoreception, the composition of words of MI-agents affected us. Without perceiving them qualitatively, we nevertheless made these descriptions comprehensible and created models of related experiences. Maybe, some of us even got a hardly explicable, peculiar feeling while reading. How is that possible? I appeal to the "perceptual symbol systems" theory here, developed by L. Barsalou [1999]. According to his view on concept formation, there is no clear distinction between initial sensorial modalities and their amodal products in the form of concepts (as some functionalist theories insist). Rather, he introduces the idea of a "perceptual symbol" — an intermediate pattern, in which associated sensorial components are, roughly speaking, folded inside:

> As memories of the same component become organized around a common frame, they implement a simulator that produces limitless simulations of the component ... Once established, these simulators implement a basic conceptual system that represents types, supports categorization, and produces categorical inferences [Barsalou 1999: 577]

While MI-agents experience synesthesia (which enables modal categorial re-synthesis to create new sensorial framing), we undergo a *semiosis*, the emergence of a new meaning. All of us are somehow experienced in playing with magnets and are acquired at least a basic vocabulary of electromagnetism. Semiosis takes place when a combination of meaningless words (like *'feel the "shape" of the wave'*) becomes meaningful. The ability of perceptual symbol systems to produce categorical inferences allows us to merge our own bodily experiences with descriptions of magnetoreception, thus forming a "virtual embodiment" — a seemingly paradoxical but conceivable set of possible experiences.

Material semiotics helps to organize reports of "I/magnet" associations in a way that exposes different dimensions of a manifold of MI-related experiences. I would like to conclude that, in principle, we might go even further and construct a writing-based exercise for reaching the conceivability of other, more complex, and hybrid associations yet to come.

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Section I: Full-sized articles

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Section II: Biohacking Forum on magnetic implants[2]

1. Magnetic sensation https://forum.biohack.me/index.php?p=/discussion/2420/sensing-questions
2. 5 unexpected interesting aspects of MI https://forum.biohack.me/index.php?p=/discussion/2458/top-5-things-that-my-brain-did-that-surprised-me-with-my-magnet-implant
3. Q+A poll for a long-time MI-users https://forum.biohack.me/index.php?p=/discussion/2934/q-a-type-poll-for-long-term-magnet-users
4. MI polarity https://forum.biohack.me/index.php?p=/discussion/1233/polarity
5. Peculiar feelings with MI https://forum.biohack.me/index.php?p=/discussion/406/what-do-you-feel-most-with-your-magnet-your-top-5

Section III: The Global View on Magnetic Implants [Harrison 2015, Appendix C, pp. XXXII–XXXVII]

Table C-7: Text Responses from those given by respondents to the question “Since having the magnet/s implanted have you had any bad experiences, recurrent pain or been hindered in day-to-day activities due to them?”

Table C-8: Text Responses from “Have you been able to ‘feel’ things like microwave ovens, computer fans or laptop power packs? If so, which is your favourite and why? What does it feel like?”

1 All links mentioned in this section have been successfully accessed. Access date: 10.05.2023

2 Quotes of MI-agents reports from this section are not only quotes from the text of the initial post (for each link) but also from texts of other respondents replying to the initial post. Main link on the Forum: https://forum.biohack.me/index.php?p=/categories/magnet-questions

Table C-9: Text responses from “Have your magnet/s or implants ever prevented you from receiving medical treatment, for example an MRI? If so, what was the outcome?”

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