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This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

Published Version:

Lobaccaro, L., Bacaro, M. (2021). What is in the Mirror? On Mirror Self-Recognition, Semiotics, and Material Engagement. RETI SAPERI LINGUAGGI, 8(1), 103-124 [10.12832/101347].

Availability:

This version is available at: <https://hdl.handle.net/11585/869655> since: 2022-02-25

Published:

DOI: <http://doi.org/10.12832/101347>

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(Article begins on next page)

WHAT IS IN THE MIRROR? ON MIRROR SELF-RECOGNITION, SEMIOTICS AND MATERIAL ENGAGEMENT

Luigi Lobaccaro, Martina Bacaro

Abstract: This paper offers a cognitive semiotic account of the emergence of meaning in the infant's aesthetic experience with mirrors. What is there in the mirror when infants look at themselves? How they develop the ability to recognize their mirror image? Starting from Eco's theory about the pre-semiotic status of mirror image, we will consider his position about mirroring as all-or-nothing experience and the problematic notion of threshold phenomena (Sec. 2). We will look at cognitive sciences to show that Mirror Self-Recognition (MSR) is a gradual process (Sec. 3), and we will focus on it through the Material Engagement Theory in order to understand how it is possible to move from the obliviousness of the mirror to self-recognition (Sec. 4). We can understand the threshold phenomenon of mirroring if only we consider mirrors as a practice in which we «experience-with» them, and not as something we «experience-of» (Matteucci 2019; Koukouti and Malafouris 2021) (Sec. 5).

Keywords: Mirror Self-Recognition, Cognitive Semiotics, Material Engagement Theory, Aesthetic Experience, Semiotics of the Mirror.

*As a child, I feared the mirror might reveal
Another face, or make me see a blind
Impersonal mask whose blankness must conceal
Something horrible, no doubt. I also feared
The silent time inside the looking glass
Might meander from the ordinary stream
Of mundane human hours, and harbor deep
Within its vague, imaginary space
New-found beings, colors, unknown shapes.
(I spoke of this to no one; children are shy.)
Now I fear the mirror may disclose
The true, unvarnished visage of my soul,
Bruised by shadows, black and blue with guilt –
The face God sees, that man perhaps see too.*

J.L. Borges, *The Mirror*

1. INTRODUCTION

The poem *The Mirror*, written by J.L. Borges, shows one of the writer's more significant obsessions. However, Borges is not the only one obsessed with mirrors. In the Western tradition, the relationship with mirrors has always been problematic, a zone of absence or excess of meaning to be filled in or calmed down with imagination and art. Starting from the Greek myth of Narcissus, it is possible to detect the

mirror topos in the whole history of painting, literature, and cinema¹. Mirror anxiety has always been traced in the endless vertigo of a multiplication of spaces, in decoupled subjectivities, in the opposition between the image evanescence and the mirror persistency. Mirrors trouble us, confuse us, but they also enchant and surprise us: for this reason, it is easy to consider the encounter with mirrors as a *sui generis* aesthetic experience, in the form that Edgar Morin defines the magic of decoupling (2016: 61-64).

Although Reality is absent in the reflection, the image, or the picture, there is always a surrealistic addition in the duplication of situations, a magic I called the «charm of the image». In other words, there is something less in the reflected image in respect to the physical reality, and something more; an aura, an affective and emotional I-don't-know (Morin 2016: 62, translated by the authors).

The anxiety and amazement in front of the mirror can be testified by anyone who has ever been in a house-of-mirrors at the Luna Park, or by whom witnesses a magic show in David Copperfield's style. It also seems that these feelings about mirrors are cross-cultural. Indeed, as the anthropologist Edmund Carpenter (1976) told, the same reactions to the mirror have been observed among the Biami natives in Papua New Guinea. Until Carpenter provided them with mirrors, Biamis had never had any artifact or natural element able to reflect a stable and precise image of themselves: this condition allowed the anthropologist to observe their reactions of fright and disturbance for the first time in front of the mirror. It seems that, at least once in life, we all have experienced the same mirror's uncanny effect: indeed, as testified by Lacan (1974), Merleau-Ponty (1964), and Zazzo (1993), just before being able to recognize themselves in the mirror, infants go through a phase in which they are pervaded by a sense of restlessness and try to avoid their image. In this paper, we will offer a semiotic account of the emergence of meaning in infant experience with mirrors. What is there in the mirror when infants look at themselves? How they develop the ability to recognize their mirror image? Starting from Eco's theory about the pre-semiotic status of mirror image, we will consider his position about mirroring as all-or-nothing experience and the problematic notion of threshold phenomena (Sec. 2). We will look at cognitive sciences to show that Mirror Self-Recognition (MSR) is a gradual process (Sec. 3), and we will focus on it through the Material Engagement Theory in order to understand how it is possible to move from the obliviousness of the mirror to self-recognition (Sec. 4). We can understand the threshold phenomenon of mirroring if only we consider mirrors as a practice in which we «experience-with» them, and not as something we «experience-of» (Matteucci 2019; Koukouti and Malafouris 2021) (Sec. 5).

2. ECO AND THE MIRROR: A STRANGE PRE-SEMIOTIC PHENOMENON

It seems that, by multiplying spaces and redoubling objects, mirrors continuously elude our attempts to give them a definite meaning. It is precisely in this pursuit of the meaning that semiotics comes into play. Umberto Eco is the first to reflect on the semiotic aspect of mirror-images, as early as the observations provided in *A Theory of Semiotics* (1976), where mirror-images were included among non-semiotic phenomena².

¹ On the importance of mirrors as topos see Pendergrast 2003; Koukouti and Malafouris (2021).

² From then on, a long (and still unresolved) debate on the mirror-image semiotic status started: on the one hand, there is Eco's position; on the other, there is who conceives the mirror-image as a sign (Sonesson 2003; 2015).

2.1. MIRRORS ALWAYS TELL THE TRUTH

Eco examines the mirror-image starting from a daily-life experience: the one in which we are in front of the mirror in the morning, staring at our reflection and shaving (Eco 1999). Firstly, he suggests investigating the salient features of the mirror in order to understand the relationship we have with it in this situation (Eco 1986).

- The mirror is a smooth and even surface that provides a virtual, straight, and symmetrical image of the object, precisely congruent to it. If it were a sign, the mirror image would be an Absolute Icon (Eco 1986: 210-211).
- The mirror has a pragmatic dimension: in order to use a mirror, we must know that we are in front of a mirror. Once we have achieved this knowledge, then we treat the mirror as if it were always telling the truth. The mirror does not translate, it always gives us back the reality in the way it is: «We trust mirrors just as [...] we trust our organs of perception» (Eco 1986: 208).
- Mirrors are: i) prosthesis, namely tools that enable us to extend or replace our organs' actions; ii) channels, that allow for the flow of information without distortions.
- The mirror manifests a pure double of the perceptive field of the object, to which we would have access even if we looked directly at the object: for this reason, the mirror-image does not trigger interpretation.
- The mirror is an absolutely rigid designator. Mirror images are always linked to something standing before the mirror, and exclusively to that thing. If it were a sign, the mirror image would be an Index (Eco 1986: 211-213).

Starting from these properties, Eco assumes that a mirror-image can never lie: thus, it seems that mirror-images are just the opposite of what a sign is. Indeed Eco (1986: 213-217), relying on his notion of sign, elaborated through a comparison between Peirce, Saussure, and the Stoics, states that:

1. When selecting something (A) as a sign of something else (B), it is because (A) becomes the present antecedent of an absent object (B). The mirror image always works with the presence of its referent.
2. A sign (A) does not require that the object (B) is its necessary cause: (B) can only be supposed to be the cause of (A). This assertion is not valid for the mirror: mirror-image is always causally produced by its referent and cannot persist with its referent absent.
3. It is always possible to produce an (A) that refers to (B) without (B) being there. Therefore, a sign «is everything which can be used in order to lie» (Eco 1976: 7). Mirror image cannot be used for lying, because it is always in the presence of its referent.
4. (A) can stand for an absent referent (B) only through a Content (C). The mirror-image is not correlated to a Content: it could be so because we confuse the mirror-image with its referent, which instead can be associated with a Content.
5. The semiotic relation is a general law that relates an antecedent type to a consequent type. It is a relationship between general classes. Instead, the mirror image is a relationship between tokens.
6. Since the sign relation is between Types, it is independent of the channel by means of which it is conveyed. The mirror image entirely matches with its channel.

7. The content of an expression is always interpretable. Mirror-image cannot be interpreted further because it has no content, only the object which it refers to can.

The Mirror-image, for these reasons, cannot be a sign, at least in the situation examined by Eco³.

2.2. MIRROR AS A THRESHOLD-PHENOMENON

One of the most shared critiques addressed to Eco is that when he speaks about mirrors, he selects only one category of mirrors, the most common one, building a grade 0 that does not exist in real world: distorting mirrors are the example that all mirrors distort the image in some way (Sonesson 2003: 226; Koukouti and Malafouris 2021). In short, the criterion is too restrictive (Bacchini 1995). It seems that this critique does not hit the mark: since the very first moment, Eco delimited the field of study to the flat mirror in order to prove that also a daily phenomenon that could intuitively be a sign, actually it is a problematic one⁴. In this sense, Eco has a firm position that also enables the investigation of other kinds of mirror experiences, characterizing them as more complex threshold-phenomena that involve some interpretation ability⁵. If we want to test Eco's theory, we think it is better to highlight its starting point: the individual must know that she is in front of a mirror, and she must know how to use it. It is possible to argue on this point. Eco combines two prior dimensions of know-that and know-how that not always get along. Indeed, as Eco himself notes, we know precisely how to comb our hair, distinguishing the right hand from the left but, when we wonder which is the right and which is the left of the mirror image, we could need some time to think on it. Nevertheless, knowing that we are before the mirror and knowing how to use it, already put us through a perceptive interpretation of the mirror-image. Thus, it is in virtue of this expertise that we can automatically interpret that specific mirror-image as the reflection of a specific object, and that we have more difficulties in linguistic interpretation. Our sensorimotor and encyclopedic competences already constitute the ground on which the comprehension of the mirror-image stands out: Eco himself says that we must learn how to use mirrors⁶. However, what is the alternative to the knowledge of the mirror as a reflective surface? In Eco's idea, the only available option is the complete unawareness about the mirror, in which the catoptric logic is not understood, and the mirror is dealt with like a transparent window. So, Eco's stance regarding the epistemic condition of the individual before the mirror is strictly binary, as also Bacchini points out (1995: 218-219): or we know that there is a mirror, and we deal with the mirror-image as a reflection, or we do not know that there is a mirror (because we have not already learned what it is or how to use it), and we deal with the reflection as an object of the world. For example, a child who does not recognize the mirror image treats the reflection of her mother as if it is the mother, and her reflection as another child (see Zazzo 1993). Then, we can note that for Eco, mirror-images are threshold phenomena in at least two senses: i) because the mirror-image is between what is a sign and what is not; ii) because the mirror enables the passage to sign

3 We have to note that it is the mirror-image that cannot be a sign. Instead, the mirror in itself can be submitted to interpretation as an artifact, or it can be adopted as an inscription surface.

4 «I think that it is legit to choose and choosing obvious cases in order to show that they are not» (Eco 1999: note 28 ch. 6).

5 Bacchini (2017) tries this pathway. He defines the mirror-image as a phenomenon that, in some cases, can assume a Semiotic Parasitic Status, partly supporting Eco on the pre-semiotic status of the mirror-image.

6 «We use mirrors well, because we have introjected the rules of catoptric refraction. We use them well, when we know that we are dealing with a mirror» (Eco 1999: 365).

from what is not. The mirror itself is the basis of the desire to build iconic signs that resemble it⁷. In Eco, the transition between the two dimensions is a catastrophe point in which we suddenly switch from a dimension to the other. Conversely, there is evidence of cases in which the epistemic condition of the individual in front of the mirror is not so marked: in the case of mirror prosopagnosia (Perconti 2008: 82–88), also said mirror sign, people fluctuate between knowing how to use the mirror when it reflects others, and not knowing how to use the mirror when it reflects their image. They disown their mirror-image and treat the reflection as if it were another person (Mulcare et al. 2012). In this case, both the dimensions co-exist. The alternativity between the two epistemic modalities is not clear even with children in the early period of the MSR process: Eco himself speaks about this phase, saying that «the moment in which the reflected ego changes the social ego is a “Structural crossroads”, or as we said before, a threshold-phenomenon» (Eco 1986: 203). However, many experimental investigations show that MSR is not a crossroad but a pathway in which the phases in-between are fluid (Rochat 2009). Thus, we want to investigate MSR development in order to account for the mirror mystery. Eco advised against this purpose (1986) because he considered almost unavoidable the risk to project adult-centric interpretations on the children’s world. Nevertheless, times have changed, and now cognitive sciences can provide a lot of suggestions and advices to theories developed inside the humanities⁸. So, instead of speaking about «the mirror image in terms of the way I use the dressing-table mirror every day, perhaps to adjust my tie» (Eco 1999: 366), we will focus on the process of attainment of the ability to which Eco refers. That moment in which «perception – thought – self-consciousness – experience with mirrors – semiosis seem to be the point of a rather inextricable knot, the points of a circle where it would be difficult to spot a starting point» (Eco 1986: 203).

3. FROM OTHERS TO ME: HOW WE LEARN TO RECOGNIZE OURSELVES IN THE MIRROR

Neither cognitive scientists were unaffected by the charm of the mirrors, and they often have looked to them in order to find answers about the issues on self and identity. Thanks to Gallup’s experiments on chimpanzees’ MSR (Gallup 1970), mirrors have enjoyed the right to enter in laboratories of neuroscientists, psychologists, and ethologists, ready to test the human and animal ability to recognize their reflection. Gallup’s test includes two stages. In the first, a mirror is placed in the chimpanzees’ cage. Animals have 10 days to get confidence with the artifact. In this period, it is possible to note that chimpanzees use the mirror to examine parts of their body that they never could reach before (such as the inside of mouth, forehead, anogenital area). After this time, experimenters anesthetize the chimps and mark their faces with a red, odorless, and non-irritating tincture. Then, they return the animals to the cage and reintroduce the mirror. In the second stage, experimenters observe chimps’ behavior. Gallup notes that when chimps wake up, they are curious about their reflection and look into the mirror for a long time touching and investigating the red mark on their faces. Red-mark detection is regarded as evidence that chimps recognize their mirror-image. Since then, a long list of other animals has been tested: albeit the results are controversial, the list of animals that have passed the mirror test constitutes a strange Borgesian

⁷ «The specular experience can explain the birth of a notion such as the (semiotic) one of the iconic sign (as hypoicon), but is not explained by it» (Eco 1999: 370).

⁸ Although in 1986, Eco discouraged to semiotically face the phase in which children develop skills about the mirror (quoting Lacan at the same time), in 1997 with Kant and the Platypus, he was one of the first that reflected upon the ties between semiotics and cognitive sciences.

Bestiary, that includes bonobos, orangutans, dolphins, elephants, killer whales, magpies, cleaner wrasses⁹. All these creatures show the ability to grasp the mirror's catoptric rules. The mirror test has also been proposed for children (Amsterdam 1972). The results have led to the conclusion that the achievement of MSR is around 24 months of age. Albeit the mirror-mark test is still the main experimental paradigm for MSR studies, the interpretation of its results is controversial. For Gallup, the test provides the researchers with the possibility to understand if the individual has any form of self-awareness: MSR corresponds to a form of subjectivity, namely a cognitive meta-representation. In Gallup's idea, when the animal touches the red mark on its face, it relates an internal mental representation of the self as a conscious subject with the mirror-image. The achievement of the mirror-test is the manifestation of a theory of mind that allows for the recognition of the self and others as cognitive subjects (Gallup 1982). Gallup's idea has been challenged by a leaner interpretation (Rochat and Zahavi 2011), which considers the MSR as proof of the development of an integrated body image. This first level of bodily reflexivity is significant for the development of the self-conscious subjectivity, but it does not entirely correspond to it. In contrast to Gallup's interpretation, the advocates of a gradualist perspective of self-awareness offer a series of critical remarks (Rochat and Zahavi 2011, 207-208):

1. Gallup considers the self-awareness as a uniform and flat feature of the self. Instead, subjectivity has to be conceived as a complex and varied collection of self-awarenesses that have many forms, and the mirror-mark test could be able to testify only for one of them.
2. When Gallup claims that MSR only testifies a knowledge that was already there as the representational conception of self-image, he does not take into account the importance that mirror self-recognition has in the development of self-awareness. In Rochat and Zahavi's idea, MSR is «a rather sophisticated and distinct type of mediated self-recognition» (2011, 207).
3. Self-concept seems to be not necessary to note sensorimotor contingencies in the mirror self-recognition (Mitchell 1997).
4. Finally, for Gallup, there is no difference between human and animal MSR: creatures accomplish the test or not. There is no attempt to differentiate the test's results, even if infants show development in MSR between 6-24 months (Amsterdam 1972).

By accepting these critiques about the graduality in the development of the self, it will be possible to draw a developmental line on five levels of MSR experience (Rochat 2009, 89-92):

- Level 0: Confusion. The individuals are completely unaware of the mirror. Mirror reflections are understood as an extension of the environment. The infants interact with their own and others' reflections as if they were flesh and blood individuals.
- Level 1. Differentiation. Infants start to distinguish between the reflections and the environment. In particular, infants find a motor contingency between their movements and those of the mirror-images. An act of perceptive differentiation is taking place: infants notice the difference between the

⁹ See for primates, Parker et al. 1995; for cetaceans, Marten and Psarakos 1995; for elephants, Plotnik et al. 2006; for magpies, Prior et al. 2008; for cleaner wrasses, Kohda et al. 2019.

perfect synchronism of bodily movement reflected in the mirror, and the direct experience of other moving entities (see Rochat and Striano 2002).

- Level 2: Situation. Now, infants explore how mirror-image changes with bodily movements. They stand in front of a strange image and enjoy its manipulation in a sort of protonarcissistic (Rochat 2009: 90) stage based on bodily movements' self-exploration. Infants start to understand that what they see in the mirror is related to themselves.
- Level 3. Identification. Infants manifest the self-recognition, that is the fact that what there is in the mirror is «Me», and not another individual staring and imitating them. This phase is recognizable by the fact that infants explicitly refer to themselves while they are exploring their mirror-image. It is from this level onwards that children pass the mirror-mark test: the mirror-image is recognized as an image of their own body.
- Level 4. Permanence. Self-recognition is no more related to temporal simultaneity or spatial bodily coincidence with mirror reflection. Individuals show a sense of self that is persistent over time and extended beyond the immediacy of mirror experience.
- Level 5. Self-Consciousness or «Meta» Self-Knowledge. Infants recognize themselves as subjects, developing, in addition to the first-person perspective, the third-person one. Now, individuals are aware of the others' gaze and exploit the mirror for knowing how they look like when others look at them.

Level 0 and level 5 match with the categories Eco draws up in order to interpret mirror-images (ignorance of the mirror/mastery of the mirror). However, we notice that from level 1 to level 4, the mirror image has a hybrid status: infants develop the MSR between 18 and 24 months of age, but it will take them some time before reaching a complete attunement between the body schema, the integrated body image, and the ability of linguistic self-referencing (Nelson 2007, 106- 108). Also, we have to consider that, in the transition from level 2 to level 3, the status of the mirror image is controversial, given that infants no longer treat the mirror image as another child, but at the same time they are not yet able to see the reflection as their own. How can we give an account of these transactions? Rochat and Nelson find the answer in the situated and cultural approach to cognition. In essence, they offer an account based on intersubjectivity, by relating the development of MSR with a symbolic (or semiotic¹⁰) ability acquired through interactions. Starting from an ecological and situated self, infants develop increasingly complex cognitive and semiotic abilities in an intersubjective environment by exploiting caregivers and interactional practices. This process gives birth to the social self (Rochat 2001). The period of anxiety, between level 2 and level 3, is related to the fact that mirrors drive infants to completely integrate their body image with a face and unitarity, which comes to correspond to their social image. In this period, the infant experiences the «me but not me» Paradox (Rochat 2009; Koukouti, Malafouris 2021), a stage in which she recognizes herself through the mirror, and at the same time, she looks at her body as an object among others: she looks at herself as others do. So, the bodily self-awareness allowed by the mirror is the combination between an implicit bodily subjectivity, an early form of bodily conceptual self, and the social self. The MSR is no longer seen as the manifestation of an all-or-nothing cognitive ability, but as a gradual process of development which identifies several degrees of self-awareness (Nelson 2007; Rochat 2009). Even by considering the importance of social and situated development in cognition, the

¹⁰ These ideas have a strong affinity to those developed in the cognitive semiotic approaches, see Konderak 2018, Paolucci 2021.

transition between level 2 and level 3 is problematic: «What remains unclear, however, is how various kinds of implicit sense of self might develop to become explicit beyond infancy, when for example infants start explicitly to label and to recognize themselves in mirrors» (Rochat 2001, 196). Indeed, it is not clear how it is possible to go from a phase in which infants handle the mirror as a reflective surface to self-recognition. Of course, intersubjectivity plays a fundamental role and constitutes the precondition for recognizing the social image, but it seems not sufficient to explain the transition phenomenon, as demonstrated in the case of autistic children. Indeed, even if in a slight delay, autistic infants succeed in the MSR test (Hobson 1990; Reddy et al. 2010), despite the fact that they have impairments in intersubjectivity, and lack of semiotic skills acquired during secondary intersubjectivity (Paolucci 2019; 2021: ch. 4). In ASD children, the only observable MSR impairment is related to the affective and emotional feature of facial self-recognition. In which way can we account for the transition from level 2 to level 3 in an ecological, embodied, and semiotic view without necessarily adopting an internalistic representational account like the Gallup one? We believe that solving this problem could also help us to understand what the status of the mirror image is in these phases. If we look closer at the set of animals that pass the mirror test, we notice that in addition to all being social animals, they are also all capable of using tools¹¹: this ability could be essential to explain the handling of animals with mirrors in pre-test moments. Indeed, the mirror is, first and foremost, an instrument, whose most appreciated material component is the ability to reflect light; but mirrors are also hard, smooth, sharp, opaque, have different shapes and sizes, and can be hanged, or placed on the floor. Can we consider the ability to use tools as another element enabling the mirror-mark test achievement? Can the material features of mirrors be considered an important aspect to account for the mirror image as a threshold-phenomenon? We will proceed in this direction, on the basis of the recent proposals by Paolucci (2021) and by Koukouti and Malafouris (2021): these two approaches agree with the idea that cognition is an external relational phenomenon in which the world plays an active role in the constitution of cognitive processes.

4. COGNITIVE SEMIOTICS, MATERIAL ENGAGEMENT AND THE STATUS OF THE MIRROR-IMAGE

The cognitive semiotic approach developed by Claudio Paolucci (2021), based on Charles S. Peirce's and Umberto Eco's semiotics, outlines an account that «consists in thinking that systems and processes of signification serve to construct significant surfaces that are useful within the interaction between an organism and its environment», conceiving cognition as «a form of effective action» (ibid., ch. 1, p. 9). One of the three main dimensions of Paolucci's Cognitive Semiotics is the Material Engagement Theory (MET) developed by Lambrous Malafouris (2013). Recently, MET has been used to account for the role mirrors have as a technology of self-objectification among different cultures (Koukouti and Malafouris 2021). We claim that MET can help us to solve the problem of MSR achievement and that Cognitive Semiotics can provide a new perspective on mirror-image as a threshold-phenomenon.

4.1. MATERIAL ENGAGEMENT THEORY AS A SEMIOTIC THEORY

Material Engagement Theory is based on the hypothesis that the human mind and the materiality of objects are intimately connected (Malafouris 2013). Material artifacts are epistemic tools with which we engage in pragmatic and epistemic actions, structuring the world we are situated in to act in it effectively.

¹¹ Even cleaner fishes (Bernardi 2012).

Indeed, Malafouris (2020) refers to the concept of thinging to explain that human thinking does not concern thinking about things, but through and with them. MET is characterized by three fundamental features, all strictly interconnected (Malafouris 2013, 51-52). Briefly, these features are:

- Extended mind. In order to explore the constitutive intertwining of cognition and material culture, Malafouris relies on 4E cognition approaches. The mind emerges in the interaction with the world: to investigate the mind, it is necessary to look at how objects are involved in cognitive processes (ibid., 57-59).
- Material agency. This notion accounts for the process in which the individual acts not upon the world, but with the world. In this view, the material agency is the product of the relationship between organism and environment. There is no possibility to localize the agency if not in the interaction itself. The agency of objects and things is therefore the symmetrical effect of human agency (ibid., 119-134).
- Enactive sign. This notion is coined to set out a process that guarantees materiality to be in continuity with cognition. The enactive sign takes the field in order to abandon the representational conception of the sign in favor of a pragmatic one: the enactive sign is an expressive sign, namely a sign that does not stand for its concept, but it «brings forth the concept as a concrete exemplar and a substantiating instance» (ibid., 97). It contributes creating meanings that do not lie in the material sign but emerge from the way in which the engagement enacts it. Enactive sign dimension is what allows objects to signify: through material engagements, materiality enables the construction of an iconic and indexical loop, in which objects develop the ability to symbolize reality and to enable interpretations. In this way, we can see the transition from material proto-signs to symbols, granted by the fact that «perceptual problems can be directly manipulated and manually resolved in real-time and space» (ibid., 115).

As Paolucci (2021) argues, the three MET principles are deeply semiotic. On the one hand, the theoretical relationship between extended mind and Peircean semiotics has been investigated by Paolucci (2011) who argues for the close similarities between these two theories of cognition. On the other hand, concerning the material agency, Malafouris explicitly mentions Latour and his Actor-Network Theory that has its roots in the Greimasian semiotics (Greimas 1983)¹². Finally, the enactive sign has an inherent cognitive semiotic dimension: its logic cannot be described by searching for communicative intention, but it has to be investigated with new methods that can account for the enactive process of bringing forth meaning. In this picture, Malafouris argues for a deeper consideration of the material aspect of enactive sign, that takes him to favour the iconic and indexical connection between the sign and the world, rather than the symbolic one¹³. Moreover, the content of an enactive sign corresponds to the possible, potential, or actual actions emerging in the interaction with the object. Meaning is something that emerges from material engagement, and this is entirely in line with the semiotic and pragmatic tenets of cognitive semiotics. At this point, we may wonder what MET has to do with mirrors. In the next paragraph, we will find the answer.

¹² For a more detailed explanation see Paolucci 2021: ch. 1, p. 11.

¹³ «Contrary to what appears to be the case in the context of language, the relationship between the signified and the signifier in the context of material semiosis is far from arbitrary. [...] in the context of material semiosis, it is precisely the absence of this arbitrariness that we must take as our point of initiation for developing a systematic account of material sign» (Malafouris 2013, p. 94).

4.2. MATERIAL ENGAGEMENT WITH MIRRORS

Koukouti and Malafouris (2021) approach mirror-image with MET categories, trying to explain how mirrors work as a technology of the self and how they enable different interpretations in different cultures. For them, mirroring is first and foremost «a visual mode of material engagement» (ibid., 7-8): i) the catoptric rules of the mirror lead to a cognitive extension (extended mind), letting us know things that we could not have known before. ii) They exhibit a material agency, allowing us to overcome the subject-object split typical of western culture: this is evident if we look at ethnographies about the role of mirrors in several other cultures. The relationship with mirrors is not always asymmetrical, as demonstrated by the conception of the mirror that Mongolian shamans have: «a living thing with a will of its own» (ibid., 12). Furthermore, iii) the enactive dimension of the material sign is what allows humans to imagine upon the power of mirrors, and it is what enables different uses of mirrors among Mongolians: they could be weapons, shields, and portals (ibid., 85-87). In their exhaustive dissertation about the anthropological role of mirrors, one of Koukouti and Malafouris' reference points is precisely Eco's reflection about mirrors and mirror-images. They agree with most of Eco's assumptions, except for the fact that mirrors always tell the truth (ibid., 21-22). Indeed, they argue that the truthfulness about mirror images is related to a cultural prejudice that enshrines mirrors only within western conception and practices of usage: the mirror never tells the truth about the world; we are always fooled by the mirror (ibid., 6-7). In our opinion, Eco would have accepted this remark: indeed, *Fata Morganas* and catoptric theaters always fool us, but in a non-semiotic way (Eco 1986, 217-221). Eco's assumption about truthfulness is not related to western common sense, but to the semiotic framework. The issue about the truth of the mirror-image is not tied to the ontology or the truth-conditional logic. Mirrors never say something true about the world. Instead, in Eco's stance, the truth has to be conceived relative to the ability to lie that signs inherently express. Eco does not deny that mirrors can distort reality, so much so that he speaks about mirror perceptive illusions, but he also says that when we interpret the mirror image, we are interpreting a kind of catoptric reflection that, as much as distorted, is causally related to its object. In Eco's argumentation, the truth has a semiotic sense, and not an ontologic one: we can lie about or through mirrors, but it does not mean they are liars: mirror images cannot lie. Those who could lie are interpretants activated about what the mirror reflects: here resides the magic of mirrors. Except for this discrepancy between the two theories, Eco's argumentations would fit perfectly with MET. Indeed, for Eco mirrors: i) have a prosthetic status that enables us to «catch visual stimuli where our eye could not reach [...] with the eye's same evidence and force» (Eco 1986, 208), allowing the individual to do pragmatic and epistemic actions by extending bodily skills; ii) have to be considered first and foremost for their catoptric rules, inherent to their material structure; iii) trigger imagination since they are the inspiration for the semiotic dream of the perfect sign, the pure Icon or Index¹⁴. Thus, if we want to assume a cognitive semiotic perspective (Paolucci 2021) that holds together Eco's semiotics and MET, we have to conceive the mirror not as something that lies to us, but as an actor that, in the cognitive loop between body, environment, and semiosis, allow for the construction of further significant surfaces which can be used in order to lie. In order to achieve this goal, we think that is useful not only taking into account a form of visual material engagement, but also a tactile one. Indeed, on closer inspection, the tactile dimension plays an important role, as can be seen in the MSR process. Indeed, in the observation of the several phases infants go through in the development of the relationship with mirrors (Amsterdam 1972; Zazzo 1993; Rochat 2009), it is possible to notice that

¹⁴ «Man's experience with mirrors may then explain the emergence of a notion like the (semiotic) one of iconism but is not explained by it» (Eco 1986: 210).

the tactile relationship is constant: the mirror is explored, tested, touched, and investigated in its materiality, creating interactional loops that shape the engagement with it. Thus, we have to use MET analytical tools, in order to look at how materiality too is constitutive in the acquisition of MSR.

4.3. MATERIALITY, BODILY SELF-AWARENESS, AND ENACTIVE SIGNIFICATION

In two fundamental papers (2008a; 2008b), Malafouris has anticipated the thesis about the role of artifacts in the construction of the self. In these works, he starts from the analysis of archeological records like the Blombos shell beads and the Mycenaean ring, and he suggests that personal objects are necessary tools in the enactivation of constitutive processes of self-awareness. Indeed, these artifacts are «as a Post-it sticker placed on a child's forehead prior to its exposure in a mirror identification experiment» (2008a: 407): they offer the possibility to infer an accomplished bodily self-recognition ability. But, at the same time, unlike the post-it removal test¹⁵ (which we have seen being interpreted by Gallup as the sign of an already achieved self-awareness), we have to consider these cultural artifacts as also having the power to transform a first-person perspective subjectivity in a social and third-person perspective subjectivity. Indeed, in Malafouris' view artifacts allow for the transition between several components of the self and the development of what is called tectonoetic awareness, conceived as «a scaffolding process of ongoing structural coupling that grounds in action and integrates the noetic and autonoetic aspects of selfhood»¹⁶ (Malafouris 2008b; 1998): our individuality is built through constant exchanges with material culture. As suggested by Koukouti and Malafouris, the mirror exactly has the same function: it «resembles a powerful attractor within a dynamic semiotic field of subjectification and self-identification» (Koukouti and Malafouris 2021: 104). Zahavi and Rochat (2011), when they shed light on the power of MSR to build new kinds of self-awareness, do not include the primary role mirror has in enacting this form of subjectivity. We argue that, by using MET, it is possible to explain the transition from level to level in the MSR. It will be immediately apparent if we resume the sequence of mirror experience levels proposed in Rochat 2009. We notice that, at Level 1 and Level 2, infants increasingly explore their mirror image, albeit they have not understood yet that the image is theirs. Infants kiss their mirror image, test motor contingencies, play with the synchronism of the reflection (Rochat 2009; Zazzo 1993; Amsterdam 1972). They explore the mirror in its bi-dimensionality and reflectivity. The mirror, in the transition from Level 0 to Level 2, actively participates in the engagement through its material properties. The attainment of Level 3 is crucial and the most problematic moment. Our idea is that in this phase, the mirror shows the fruits of enactive signification already underway since the first interactions, transforming the relationship and bringing forth the symbolic dimension. Levels preceding the third are those in which an iconic-indexical loop between the individual and the materiality of mirrors is staged. The loop allows the child to associate her reflection with her body through repeated material engagements. For this reason, it is not risky to link this spiral iconic-indexical loop with what Eco says about the mirror image: indeed, he defines mirror image as a form of pure Iconicity and Indexicality, that is precisely the reason why the characterization as a sign is not allowed¹⁷. By experiencing iconicity and

15 Sometimes post-its are used in mirror self-recognition experiments in substitution of red marks (see Rochat 2009: 90-91, fig. 4).

16 «Noetic awareness will refer to the basic sense of oneself as acting in and on the environment at a time according to one's first person perspective (1PP). Autonoetic awareness will refer to sense of one-self as a unique individual persisting over time able not only to interact with objects and others according to one's first person perspective (1PP) but also to reflect on one's perspective» (Malafouris 2008a: 407).

17 For Eco pure Icons (Firstness) and Indexes (Secondness) cannot exist, insofar as the sign always shows the co-presence of iconic, indexical, and symbolic features (Eco 1976); that is, there is always a Thirdness (General law or Symbol) that allows the interpretation of something as a sign of something else (Eco 1986: 210-213).

indexicality in this complex phase and by setting material and semiotic loop, the child-mirror system develops the ability to produce interpretations regarding mirror images. A sign emerges, that is not an internal representation neither of the infant nor of the mirror: its signification matches with the pragmatic actions of recognition of an integrated body image. When this process occurs, the infant experiences the «me but not me» Paradox¹⁸. At Level 4 and Level 5, the semiotic ability enacted by the mirror has to be attuned to other cognitive and semiotic abilities developed in interaction with the world and with others (for instance, language, imagination, memory). Infants slowly learn to use their body image as a sign that can be used in order to lie. They dress up, wink at themselves, look furtively, clowning: that is, they learn to modulate their social image. Thus, in this perspective, the attainment of mirror bodily self-awareness is made possible not only thanks to the intersubjective dimension and social practices, but it is also the outcome of the story of the coupling between the individual and a particular artifact, which provides a unique form of self-recognition. Later, mirrors will also affect more developed forms of subjectivity: a distinct sense of self emerges from the mastery of mirror-images, realizing an enhanced reconfiguration from the persisting and long-term relation with mirrors. Once again, Eco anticipated us, saying that:

When grow up, we are the way we are just because we are (also) catoptric animals and have developed a double ability to look at ourselves (insofar as it is possible) and other in our and their perspective reality and catoptric virtuality (Eco 1986, 207).

We are no native catoptric animals; we become them: through material relations (Matteucci 2019, 28) we recognize the relationship between the mirror and the individual standing in front of it.

5. SOLVING THE MIRROR ENIGMA

Now, we can provide a new interpretation of what Eco defined a threshold-phenomenon, based on our investigation of MSR stages and MET. The mirror provides us the possibility to create a semiotic self-concept, and it does that through an ongoing process of interactions in which it actively becomes part of the cognitive advancement of those who look at it. Thus, the status of the mirror and mirror image is not pre-semiotic: basically, the mirror does not engage the interaction as a sign, but as co-producer of signs. If in semiotics the mirror is something, it is an enactive sign. Every day while we comb our hair in front of the mirror, we do not perceive its power because we have mastered it within the interactions. However, its enactive signification nature emerges whenever we face strange mirroring phenomena, that is to say, other threshold-phenomena. For instance, when we orient ourselves in the house of mirrors, or we have to recognize ourselves in front of distorting mirrors. In these cases, they constitute a center of semiotic gravity that generate a Material Collusion (Matteucci 2019, 12). In these collusions, mirrors create an aesthetic experience, something that exceeds meaning, and that has to be seen as an action we actively do-with and not as something that happens to us (Malafouris 2011, 183-185). Hence, combining Eco's perspective and MET-based cognitive semiotics, we can highlight the material dimension of the mirror. This material dimension, too long forgotten by semiotics and cognitive sciences, is the key to understanding why mirrors drive us crazy: they bring forth semiotic worlds that we navigate, and they reveal us our image. Mirrors are active producers of signs, with which we are in debt. To some extent, we are signs of the mirror. It seems Borges understood that a long time ago.

¹⁸ Koukouti and Malafouris (2021, ch. 7) describe the phenomenology of «me but not me» paradox within a comparative anthropological framework.

Luigi Lobaccaro
Università di Bologna
Dipartimento di Filosofia e Comunicazione
Via Azzo Gardino 23
Bologna
luigi.lobaccaro2@unibo.it

Martina Bacaro
Università di Bologna
Dipartimento di Informatica Scienza e Ingegneria
Viale Risorgimento 2
Bologna
martina.bacaro2@unibo.it

REFERENCES

- Amsterdam B. (1972), Mirror Self-Image Reactions Before Age Two, in «Developmental Psychobiology», 5(4), 297-305.
- Bacchini F. (1995), Riflessioni sugli specchi, in «Il Cannocchiale», 3, 211-224.
- Bacchini F. (2017), Lo status semiotico dei fenomeni speculari/ On the semiotic status of mirror phenomena, in «Rivista Italiana di Filosofia del Linguaggio», 11(1).
- Bernardi G. (2012), The Use of Tools by Wrasses (Labridae), in «Coral Reefs», 31(1), 39.
- Carpenter E. (1976), The Tribal Terror of Self-Awareness, in P. Hockings (ed.), *Principles of Visual Anthropology*, Berlin, de Gruyter.
- Eco U. (1976), *A Theory of Semiotics*, translation by Umberto Eco, Bloomington, Indiana University Press.
- Eco U. (1986), *Semiotics and Philosophy of Language*, Bloomington, Indiana University Press.
- Eco U. (1999), *Kant and the Platypus: Essays on Language and Cognition*, translated by A. McEwen, London, Secker & Warburg.
- Gallup G. (1970), Chimpanzees: Self-Recognition, in «Science», 167(3914), 86-87.
- Gallup G. (1982), Self-awareness and the emergence of mind in primates, in «American Journal of Primatology», 2(3), 237-248.
- Greimas A.J. (1983), *Du Sens II – Essais sémiotique*, Paris, Edition du Seuil.
- Hobson R.P. (1990), On the origins of self and the case of autism, in «Development and Psychopathology», 2(2), 163-181.
- Kohda M., Hotta T., Takeyama T., Awata S. et al. (2019), If a fish can pass the mark test, what are the implications for consciousness and self-awareness testing in animals?, in «PLOS Biology», 17(2), e3000021.
- Konderak P. (2018), *Mind, Cognition, Semiosis: Ways to cognitive semiotics*, Lublin, Maria-Curie Skłodowska University Press.
- Koukouti M.D., Malafouris L. (2021), *An Anthropological Guide to the Art and Philosophy of Mirror Gazing*, London, Bloomsbury.
- Lacan J. (1966), Le stade du miroir comme formateur de la fonction du Je, in J. Lacan, *Écrits*, Paris, Éditions du Seuil, 93-100.
- Malafouris L. (2008a), Beads for a plastic mind: The «blind man's stick» (BMS) hypothesis and the active nature of material culture, in «Cambridge Archaeological Journal», 18(3), 401-414.
- Malafouris L. (2008b), Between Brains, Bodies and Things: Tectonoetic Awareness and the Extended Self, in «Philosophical Transactions of the Royal Society of London Series B 363», 1993-2002.
- Malafouris L. (2011), The Aesthetic of Material Engagement, in Manzotti R. (ed.), *Situated Aesthetic. Art beyond the skin*, Exeter, Imprint Academic, 171- 194.

- Malafouris L. (2013), *How Things Shape the Mind. A Theory of Material Engagement*, Cambridge, The MIT Press.
- Malafouris L. (2020), Thinking as «Thinging»: Psychology with Things, in «Current Directions in Psychological Science», 29(1), 3-8.
- Marten K., Psarakos S. (1995), Evidence of self-awareness in the bottlenose dolphin (*Tursiops truncatus*), in Parker S.T., Mitchell R., Boccia M. (eds.), *Self-Awareness in Animals and Humans: Developmental Perspectives*, Cambridge, Cambridge University Press, 361-379.
- Matteucci G. (2019), *Estetica e natura umana*, Roma, Carocci.
- Merleau-Ponty M. (1964), The Child's Relations with Others, in M. Merleau- Ponty (ed.), *The Pof Perception*, Evanston, IL, Northwestern University Press, 96-155.
- Mitchell R. (1997), Kinesthetic-Visual Matching and the Self-Concept as Explanations of Mirror Self-Recognition, in «Journal for the Theory of Social Behavior», 27(1), 17-39.
- Morin E. (2016), *Sur l'esthétique*, Paris, Robert Laffont.
- Mulcare J.L., Nicolson S.E., Bisen V.S., Sostre S.O. (2012), The Mirror Sign: A Reflection of Cognitive Decline?, in «Psychosomatics», 53(2), 188-192.
- Paolucci C. (2011), The 'External Mind': Semiotics, Pragmatism, Extended Mind and Distributed Cognition, in «VS-Quaderni di studi semiotici», 112-113, 67-94.
- Paolucci C. (2019), Social Cognition, Mindreading and Narratives. A Cognitive Semiotics Perspective on Narrative Practices from Early Mindreading to Autism Spectrum Disorders, in «Phenomenology and the Cognitive Sciences», 18(2), 375-400.
- Paolucci C. (2021), *Cognitive Semiotics: Integrating Signs, Minds, Meaning and Cognition*, in press.
- Parker S.T., Mitchell R., Boccia M. (eds.) (1995), *Self-Awareness in Animals and Humans: Developmental Perspectives*, Cambridge, Cambridge University Press.
- Pendergrast M. (2003), *Mirror Mirror: A History of the Human Love Affair with Reflection*, New York, Basic Books.
- Perconti P. (2008), *Autocoscienza. Cosa è, come funziona, a cosa serve*, Roma-Bari, Laterza.
- Plotnik J.M., de Waal F.B.M., Reiss D. (2006), Self-Recognition in an Asian Elephant, in «Proceedings of the National Academy of Sciences», 103(45), 17053-17057.
- Prior H., Schwarz A., Güntürkün O. (2008), Mirror-Induced Behavior in the Magpie (*Pica Pica*). Evidence of Self-Recognition, in «PLOS Biology», 6(8), e202.
- Reddy V., Williams E., Costantini C., Lan B. (2010), Engaging with the Self: Mirror Behaviour in Autism, Down Syndrome and Typical Development, in «Autism», 14(5), 531-546.
- Rochat P. (2001), Origins of Self-Concept, in Fogel A., Bremner G. (eds.), *Blackwell Handbook of infant development*, Oxford, Blackwell, 191-212.
- Rochat P. (2009), *Others in mind*, New York, Cambridge University Press.
- Rochat P., Striano T. (2002), Who's in the Mirror? Self-Other Discrimination in Specular Images by Four- and Nine-Month-Old Infants, in «Child Development», 73(1), 35-46
- Rochat P., Zahavi D. (2011), The Uncanny Mirror: A Re-Framing of Mirror Self- Experience, in «Consciousness and Cognition», 20(2), 204-213.
- Sonesson G. (2003), Why the Mirror Is a Sign – and Why the Television Picture Is no Mirror. Two Episodes in the Critique of the Iconicity Critique, in «S. European Journal for Semiotic Studies», 15(2-4), 217-232.
- Sonesson G. (2015), The Mirror in-between Picture and Mind, in «Chinese Semiotic Studies», 11(2), 159-180.
- Zazzo R. (1993), *Reflets de miroir et autres doubles*, Paris, PUF.