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From Cradle to Internet. The Social Nature of Personal Identity

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Abstract Contrary to what Descartes argued many centuries ago, the self seems far from being a simple and indivisible entity, easily accessible to personal scrutiny. In this paper I will endorse an anti-Cartesian attitude, starting from two different perspectives. On the one hand, I will consider clinical and developmental studies showing how strongly interpersonal relations modulate the quality of introspective access. In this section, I will take into account Neisser's theory of self-knowledge and Gergely and Watson's constructivist approach. On the other hand, I will consider the extended mind paradigm, a recent philosophical model that seems compatible with the idea that some important aspects of the self may extend to the physical world. This latter point acquires special importance when considering how widespread certain electronic tools such as second generation search engines will be in the future.

KEYWORDS: Self; Levels of Self-knowledge; Nativism; Constructivism; Extended Mind; Extended Self.

Riassunto *Dalla culla a internet. La natura sociale dell'identità personale* – Contrariamente a quanto affermato da Cartesio parecchi secoli fa, il sé non sembra affatto essere un'entità semplice e indivisibile, facilmente accessibile all'auto-indagine. In questo articolo assumerò un atteggiamento anticartesiano, partendo da due diverse prospettive. Da una parte, prenderò in considerazione studi clinici e di psicologia dello sviluppo che mostrano quanto fortemente le relazioni interpersonali modulino la qualità dell'accesso introspettivo. In questa parte farò riferimento soprattutto alla teoria della conoscenza di sé di Neisser e all'approccio costruttivista di Gergely e Watson. In secondo luogo mi confronterò con il paradigma della mente estesa, un modello filosofico recente che pare compatibile con l'idea che alcuni aspetti importanti del sé possano venire estesi al mondo fisico. Questo secondo punto acquisisce un'importanza particolare quando si consideri fino a che grado alcuni strumenti elettronici come i motori di ricerca di seconda generazione saranno diffusi nel futuro.

PAROLE CHIAVE: Sé; Livelli di conoscenza del Sé; Innatismo; Costruttivismo; Mente estesa; Sé esteso.



The Self among the Others

«I KNOW PAINLY THAT I can achieve an easier and more evident perception of my

own mind than of anything else »,¹ said Descartes almost four centuries ago, but today we know that he was wrong. A more specific quotation is particularly controversial:

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There is a great difference between the mind and the body, inasmuch as the body is by its very nature always divisible, while the mind is utterly indivisible. For when I consider the mind, or myself in so far as I am merely a thinking thing, I am unable to distinguish any parts within myself; I understand myself to be something quite single and complete.²

On the contrary, many neuroscientific studies show that different levels of consciousness, along with the related senses of identity they trigger, coexist in one and the same person, but sometimes one of them breaks down (*e.g.*, Damasio).³ In a developmental psychological perspective, some decades ago Ulric Neisser⁴ individuated five kinds of knowledge of the self, starting from the most elementary structure up to the full-blown metacognitive self-identity:

- ecological self
- interpersonal self
- extended self
- private self
- conceptual self

Despite the title of Neisser's article, only the last three levels of self-awareness correspond to genuine forms of *knowledge*. In point of fact, the ecological and interpersonal selves are structures of self-information which, in a Gibsonian perspective, are implicit in each act of *perception*. The very act of perceiving anything, be it an external object or an inner event, carries with it the perception of ourselves as perspectival agents. The *ecological self* is the very precocious self as perceived with respect to the physical world. To describe with an adult sentence what an infant pre-linguistically feels, we could say that she is implicitly aware of being a physical object among other physical objects. But the ecological self is also aware of being a *special* physical object: it is the agent, the actor who «initiates movements, perceives their consequences, and takes pleasure

in its own effectivity».⁵

The *interpersonal self*, which is also very precocious, is the self as perceived specifically with respect to the agentive world: "I am an agent among other agents, and we are all engaged in this *agentive* interchange". It refers to the awareness of being an agentive body who stands in relationship – or seeks to stay in relationship – with other agents.

The *extended self* is constituted by our memories and anticipations of experienced events. It corresponds to the level of self-knowledge that gets paradigmatically destroyed in amnesia. As Antonio Damasio has shown with his extensive analysis of neuropsychological data, even the most severe forms of amnesia preserve timeless, more primitive but not less important aspects of this kind of instantaneous self-awareness.

The *private self*, which can be viewed as the most similar structure with respect to the Cartesian tradition, corresponds to the sense of having a particular mental perspective, a special point of view which is not automatically shared with others. "I am a thinking (and also perceiving, desiring, fearing) *res*, and my beliefs (perceptions, desires, fears) are the cause of my behavior".

Finally, the *conceptual self* is the self structured in categories, "personal labels" that both ourselves and others attach to us: "I am a woman, a wife, a mother, a professor, a lover of J.S. Bach and pizza margherita, and so forth". This conceptual dimension is modulated on an ongoing basis throughout life as a person takes part in a culture, a society, a group. G.H. Mead intensively studied the social self from a sociological perspective, in order to better understand the process of integration, and – in his view – the formation of a new identity by USA immigrants at the beginning of the XXth century.⁶

The composite nature of self-awareness not only falsifies the illusion of a unitary self, but also challenges another Cartesian illusion, *i.e.*, the idea of the "autonomy" of the subject who, in order to know herself, has only to "look inside".

Indeed, in this paper I shall argue that (1) all the levels of self-information and self-knowledge correspond to informational structures somehow influenced by interactions; and that (2) even some aspects of the inanimate world (e.g., electronic tools) could intervene in the structuring process of the self. In the following, I will continue to refer to Neisser's five levels to highlight some relevant points.

Social relations and the mind

Lev S. Vygotsky⁷ is probably the most brilliant defender of the idea that, in all its dimensions, knowledge, and specifically self-knowledge, has a social nature. The adult's *scaffolding*⁸ helps the child to develop her cognitive capacities in any domain, including self-knowledge. As shown by the Vygotskian example concerning how the young child comes to understand the meaning of the pointing gesture, each level of comprehension is reached within a social context and only later is progressively interiorized. While at the beginning the child simply directs her arm at an object trying to reach it, the adult immediately and spontaneously understands the gesture's communicative meaning. As a consequence, the adult satisfies the child's desire, giving the child the *requested* object.

Finally, that externalized meaning is shared and interiorized by the child: a failed grasping movement has now become a successful communicative action. According to Vygotsky, the same process of progressive interiorization characterizes the development of self-knowledge:

The social dimension of consciousness is primary in time and in fact. The individual dimension of consciousness is derivative and secondary.⁹

Actually, Vygotsky's constructivism is committed to a radical empirical framework that can no longer be defended, in view of the large amount of data showing that the

human mind is far from being a *tabula rasa* at birth. From this perspective, Neisser and other researchers I will examine in what follows should be considered as the contemporary heirs of the Vygotskian tradition. For example, authors such as Watson, Bahrich and Gergely defend a nativist idea according to which some conceptual structures and mechanisms are innate and already at work since infancy, while they cautiously avoid postulating a mind already-mature-at-birth.

According to Gergely and Watson,¹⁰ even the ecological self, *i.e.*, the most primitive form of self-awareness, crucially contains social elements. In a well known experiment,¹¹ young children are given the option of choosing between two videos to watch, one featuring their own legs moving in real time, the other featuring the movements of another child of their own age whom they cannot distinguish as another child, because all the children wear identical clothes. Or, in a different experimental condition, the video does not show another child, but the same children-watchers, who can look at themselves in a delayed video showing their previous behavior. Clearly, the online images of the children's own bodies represent synchronously and faithfully their movements, whereas the alternative movie (both in the "other child" and in the "delayed" conditions) represents a different situation, insofar as another person (or a past, desynchronized self) is involved.

Following Neisser's levels of self-knowledge, it seems reasonable to associate the first, perfectly synchronized representation, with the representation of the ecological self, as the perceived movements mirror the movements of the child's body and correspond to her agentive feelings. To the extent that the delayed images (again, in both the "other" and in the "delayed self" conditions) do not perfectly refer to the child's current movements, they can be taken to represent another agent potentially engaged in a social exchange.

Children turn out to be capable of discriminating between the first situation,

which in the authors' terminology is perfectly *contingent*, and the second one, which is highly but less than perfectly contingent. Thus, they seem capable of distinguishing between themselves and their peers on the basis of temporal-causal contingencies. No less notably, they show a clear preference trend that depends on their age. Children younger than three-months significantly prefer to look at their own moving bodies. They are attracted by the image of their bodily-agentive self: the ecological self.

In contrast, four-month-old children prefer to observe the other child or the delayed self-image. Now, what could be the meaning of the change of preference systematically evidenced around the end of the third month? Why do children almost invariably¹² begin to prefer less than perfectly contingent images?

This reversal of preference seems to indicate a growth of interest in the *social* world. Unlike the actions we ourselves plan and perform, other people's movements are never perfectly contingent with ours. Even when someone is imitating us (as we will see is common in infant-adult communicative exchanges), she never perfectly mirrors our movements.

We can thus turn to the second dimension of self-knowledge (or, we should rather say, self-perception): the *interpersonal self*. The interpersonal self, which still does not require concepts, is a precocious level of self-awareness corresponding to the ability of perceiving ourselves as distinct from other agents and interacting with them in a peculiar way, which is different from the way the ecological self interacts with inanimate objects. Therefore, thanks to this developmental step, self-knowledge assumes a still more explicit relational nature.

Children begin to engage in social relationships at two-three months. Yet, even if distinct and easily recognizable, in the interpersonal domain primitive self-awareness is also built on the basis of dynamic cues. What is at stake in this case is no longer something

like the perception of an approximating object, but rather the dynamics of *reciprocal* interactions with other agents. The prototypical interactive exchanges occur during *proto-conversations*, the most common context of dyadic, emotional relationships involving a child and her caregiver.¹³ Both partners actively interact, reciprocally exchanging information during a conversation made of imitations (but also of subtle episodes of desynchronization), improvisations, search for eye-to-eye contact, sensitivity to vital forms,¹⁴ and so forth.

To reach the three more advanced levels of self-knowledge, concept possession is required. We can also define these three levels as metacognitive, since they imply conceptual analysis of the mind; nevertheless, it is possible that children achieve at least some early conceptual understanding of their mind functioning in an implicit, prelinguistic way. It is such a theoretical attitude that is endorsed in the framework sketched by Gergely and Watson.¹⁵ They suggest not only that the bases of the private self (*i.e.*, the third level in Neisser's framework) are precocious, but also that (good) intersubjectivity is needed to ensure a (good) maturational process. Their hypothesis is based on the functioning of a psychological mechanism which is innate but needs the intervention of other agents to be triggered and to be maintained in good functioning.

In this perspective, it is considered that the child is innately tuned to develop introspective capacities. Yet, Gergely and Watson criticize many contemporary authors working from different perspectives,¹⁶ who, subscribing to a psychological perspective that can be traced back to Freud himself, take for granted that the child is capable of introspection and able to recognize her emotions from her first weeks of life. By contrast, according to Gergely and Watson introspection is the outcome of a developmental process whose success depends on the input of other human beings, possibly well attuned to the child. Specifically, the child acquires sensitivity to her emotions and sensations through a pro-

cess of *social biofeedback*, an expression which indicates the social application of a phenomenon well known to physiologists.

Take a physiological state (*e.g.*, blood pressure) that a person is unaware of, and continuously monitor this physiological dimension by mapping it onto an external perceptible device – *e.g.*, a gauge. It is well established that the feedback provided by repeated exposures to such external representations progressively makes the person conscious of her internal processes.¹⁷ According to Gergely and Watson, in the interpersonal domain a similar *social* biofeedback is provided by adults' marked mirroring of infantile emotional expressions, especially in the context of protoconversations.

At the beginning, the baby experiences emotions only as undifferentiated states, and is unable to connect her internal undifferentiated feelings and dispositions to any emotional category. This learning process takes place with the intervention of an attuned caregiver, who plays the role of the gauge in blood pressure sensitization. The adult interprets and mirrors infantile facial and postural expressions, letting her connect her feelings to an external, perceptually accessible category. The process of biofeedback is thus triggered, and will complete with a full-blown capacity.¹⁸

Turning now to a clinical dimension, Bowlby's attachment theoretical framework¹⁹ is probably the clearest demonstration of the impact of personal interactions even on the most mature levels of self-knowledge. Many years of rigorous observations of child-caregiver interactions led Bowlby to distinguish four different styles of attachment: secure, avoidant, resistant-ambivalent, and disorganized. Even though the secure attachment style turns out to be the most desirable condition with respect to all the others, the most important distinction for our present discussion is the one between organized and disorganized attachment. After all, secure, avoidant, and resistant-ambivalent are all attachment styles characterized by a degree of

organization that varies from optimality to sufficiency.

Even the resistant-ambivalent style, while presenting an intrinsic dichotomy and instability, still maintains an acceptable level of coherence. In contrast, coherence is completely missing in disorganized attachment, which is not infrequent in dyads where the adult has recently suffered from a loss. Under such conditions the caregiver, who is supposed to offer protection, is himself in need of being cared for, thus forcing the baby to reverse her natural role. Moreover, the simple physical presence of the child often evokes to the adult the absent person, soliciting painful episodic memories and thus provoking further intense suffering, which in turn can trigger violent or otherwise dysfunctional reactions. As a consequence the child, who is just a fragile person to be taken care of, ends up assuming three incompatible and pathogenic roles at the same time: Persecutor, Rescuer, and Victim.²⁰

According to Bowlby, traces of each interaction are registered in the *Internal Working Models* (IWMs), an intrinsically interpersonal mnemonic organization which structures the autobiographical-narrative dimension of self-consciousness,²¹ *i.e.*, the most refined dimension of self-knowledge in Neisser's list. It follows that the child with disorganized attachment, because of the multiple roles she has to play, progressively constructs a self-image with a high and dangerous level of incoherence.

It is therefore clear that self-consciousness, which in the Bowlbian tradition has an explicit interpersonal dimension, cannot but suffer when interpersonal relations are strongly dysfunctional, as frequently happens in disorganized attachment styles. When the sense of self cannot reach an acceptable level of coherence and continuity, pathological conditions frequently occur. As a matter of fact, disorganized attachment styles (and disorganized IWMs) strongly correlate with adult personality and dissociative disorders, such as borderline personality disorders and disso-

ciative identity disorders.

Concerning more specifically the conceptual self, *i.e.*, the self which is the conceptualized image of how other people perceive us, its social dimension is obvious, intrinsic to its definition. Without interpersonal relationships one has no mirror image to be confronted with, and intense suffering tends to follow. Referring only to the social self (but, as Bowlby heirs, we could say the same with regard to the interpersonal self), William James wrote:

No more fiendish punishment could be devised, were such a thing physically possible, than that one should be turned loose in society and remain absolutely unnoticed by all the members thereof. If no one turned round when we entered, answered when we spoke, or minded what we did, but if every person we met “cut us dead”, and acted as if we were non-existing things, a kind of rage and impatient despair would ere long well up in us, from which the cruellest bodily tortures would be a relief; for these would make us feel that, however bad might be our plight, we had not sunk to such a depth as to be unworthy of attention at all.²²

The Self in the Net

Having seen how crucially other persons are involved in the modulation of personal identity, we now turn to investigating whether interactions with certain kinds of objects could somewhat impact some aspects of self-identity. Obviously, as we saw in the previous pages, interaction with the world is important to constitute the bodily-agentive self, *i.e.*, the sense that our body has boundaries and can act on objects, for example to move them. Since his seminal work *Principles of Psychology*, William James put forward a stronger position:

The same object being sometimes treated as a part of me, at other times as simply

mine, and then again as if I had nothing to do with it at all. *In its widest possible sense, however, a man's Self is the sum total of all that he CAN call his*, not only his body and his psychic powers, but his clothes and his house, his wife and children, his ancestors and friends, his reputation and works, his lands and horses, and yacht and bank-account. All these things give him the same emotions.²³

The only constraint to satisfy in order to become part of the material self (the *Me*, in James' terminology) is that we feel “warmth and intimacy” about those external objects. While being persuaded that James' provocative claims contain some very interesting suggestions that could be useful to analyze into details, in this paper I am mainly interested in the more contemporary issue of exploring whether continuous interaction with technological tools may somehow affect any dimension of personal identity.

Imagine connecting your brain to an electronic tool that instantaneously calculates any logarithm or, if you prefer, the quickest way to your home: would your mind be extended to that tool? And would *you* become smarter?

This kind of questions characterizes the *Extended Mind Model*, first proposed by Andy Clark and David Chalmers²⁴ and then elaborated by Clark and other authors,²⁵ but openly reminiscent of Lev Vygotsky's work.²⁶ Not every external computational tool can become a mental extension. To constrain the mental domain Clark and Chalmers propose the *Parity Principle* (PP):

If, as we confront some task, a part of the world functions as a process which, were it to go on in the head, we would have no hesitation in accepting as part of the cognitive process, then that part of the world is (for that time) part of the cognitive process.²⁷

PP is clearly a functionalist principle, as it

distinguishes mental facts on the basis of the functional role of processes and representations. Provided that they play the appropriate causal role, even non-biological elements can become part of the mental. Moreover, the same element can be part of the mental on some occasion, while in other situations, when it lacks the relevant causal role, it is expelled from the mind. What PP suggests then is a dynamic and fuzzy-bounded concept of the mind.

Yet some further constraints delimit the ontological liberalism implied by PP: (1) the external resource should be reliably available and typically invoked; (2) any information retrieved should be more or less automatically endorsed, (3) easily accessible and (4) consciously endorsed at some point in the past.

According to (1) and (3), my old dusty encyclopedia in the garage is not (at least, no longer) part of my mind, while (2) requires that we (*ceteribus paribus*) trust the source, thus making questionable, *inter alia*, other people's advice. The strongest criterion, (4), has been considered too restrictive by Clark himself.²⁸ After all, one of the main findings of the cognitive sciences has been that conscious processes are the tip of the iceberg: for reasons that are different from those postulated by Freud, the vast majority of mental processes have to be considered implicit, unconscious. Empirical data do not allow any doubt on this point.

Concerning the first three points, it is also noticeable that they are somehow reminiscent of James' affective requirement. Having an external resource easily available and accessible, and trusting it, amounts in an important sense to feeling warmth and intimacy towards it. The four criteria (together with PP) are captured by the notion of *transparency*: transparent technologies are those tools that are so well integrated with our internal processes that they are no longer noticed. We will return to this point later.

Actually, some authors²⁹ put into question the four principles. According to Gallagher, the three criteria (he already excludes (4)) are

a matter of degree rather than having an all-or-nothing nature. For example, while violating (1) and (3), many institutional and collective practices (in his example, the legal code) could well be part of the minds of some people. Concerning (2), Gallagher invites us to imagine someone who, having a skeptical attitude, almost always puts acquired information in doubt. Well, the same careful scrutiny he continuously performs makes the information thereby acquired a genuine part of that person's mind.

After all, judgment is a mental activity, and it takes part in the internal mind. Though interesting, Gallagher's claim is not decisive for our purposes. Even if we decide to reject his objections, thus taking the extended mind into the boundaries originally stated by Clark and Chalmers, what I am going to discuss could still be relevant.

Externalizing our senses

Proponents of the *Extended Mind Model* spend many pages on describing various kinds of technological tools that widen the mental domain outside the head. No doubt one of the most interesting examples is constituted by the complex implants that help neurological patients to recover some aspects of their lost perceptual or motor abilities. A paradigmatic case is constituted by the well known Bach-y-Rita implant, which, exploiting tactile stimulation instead of vision, helps blind people to somehow "see" the world.

A few decades ago, the neuroscientist Bach-y-Rita developed a technological device, the Tactile Vision Substitution System, whose functioning is based on a video camera put on the head of a blind person. The scene coming from the external environment is transduced into vibratory stimuli that are displayed on the person's back.³⁰

Soon after the beginning of the experiment, blind people reported that they became able to exploit the camera as seeing people currently use their eyes: to analyze the visual scene in front of them, search and rec-

ognize objects, and so forth. The tactile stimuli they received were reportedly processed as “*quasi-visual*” information. Other experimental data,³¹ showing that we can enlarge our phenomenal body to include tools such as sticks, confirm that the sensorial body can be augmented by more or less sophisticated tools.

Overall, I take these data to highlight a very important point, generally underestimated because of the greater spectacularity of Clark and Chalmers’ “cognitive” examples, such as the case of Otto and Inga described in the next section. In fact, I take the perceptual-sensorial examples seen above as relevant not only to the discussion concerning the possible extensions of the *mind*: they also suggest that some aspects of the *self* can be extended outside the brain. In fact, what blind people in Bach-y-Rita’s experiment report is an augmentation of their *phenomenal* experience. We will return to this topic at the end of the paper.

From Otto to Mary

Clark and Chalmers focus their attention on the possibility that some aspects at the cognitive level can also be extended, as suggested by the well-known Otto and Inga thought experiment.³² Having heard of an interesting new exhibition at the MOMA in New York, Inga remembers that the museum is on 53rd Street and goes there. Otto, who suffers from a mild form of Alzheimer’s disease, has acquired the habit of writing any potentially useful information in a notebook that he always carries with him. Thus, when he hears of the exhibition at MOMA, he retrieves the address from his notebook and sets off.

According to PP, since the functional roles of Otto’s notebook and Inga’s biologic memory are the same, we should conclude that both persons *believe* that the MOMA is on 53rd Street, independently of the fact that Otto’s belief comes from a computational process exploiting an external support. Thus,

they have the same *extended* mental state – more precisely, the same *mental* state, as the extended mind *is* genuinely mental. Let us stop and look more closely at this example. Which aspect of Otto’s mind has possibly been extended beyond his skull?

A notebook is an inert container from which different processes can get the information to be elaborated; it is nothing more than a big, passive memory store. Now, memory is undoubtedly an essential element to structure and maintain personal identity in time, as remarked by Locke’s prince and cobbler thought experiment.³³ Locke invites us to imagine a prince whose memories are *all* transferred to a cobbler; arguably, in that situation we would conclude that the person of the prince has been transferred into the cobbler’s body. While wholly subscribing to this intuition, I cannot but notice that what has been transferred in Locke’s thought experiment is not only information, but also the capacity to access that information and to have what today we would call inferential capacities. In other words, there is a simultaneous transfer of information *and* processes.

On the other hand, Otto’s inferential processes, which are essential for mental activities such as perception, categorization, decision-making, and abstract reasoning, still run in his head. So, rather than speaking of an extended mind, we should speak of a biological mind supported by an external memory. It is an interesting, but not “revolutionary” augmentation of his mind.

Let us now look at Mary, the young cashier working in the grocery store near my house. Every time she needs to calculate change she uses the cash register, even when I give her \$3 to pay for a snack which costs \$2.50. As she trusts her calculator, she has stopped calculating the change on her own. Unlike the case of Otto’s notebook – but analogous to Locke’s thought experiment – what are externalized from Mary’s head are not only passive factual memories, but dynamic mental *processes*, *i.e.*, that capacity of reasoning and accessing memory which, even in the extended para-

digm, mostly characterizes the mental domain. Consistent with the functionalist attitude underlying PP, which is centered on procedural isomorphism, one could suppose that Mary's mind is more genuinely extended than Otto's. Actually, it is.

Nevertheless, even Mary's case does not turn out to be fully compelling. No doubt, the supermarket cash register, as a pocket calculator, allows Mary to extend her inferential capacities to the algebraic domain; nevertheless, planning and decision making are still processed by her biological mind. The calculator does its computational work well, but it is always Mary who takes all the non-algebraic *decisions*.

Cristina and GO

Every day Cristina works for many hours at her computer which is always connected to the internet. At home, while she is doing other activities – reading a novel, or cooking, for example – she never disconnects. Until recently, when Cristina could not remember an historical date, she would have consulted the encyclopedia on the shelf; or, when she wanted to know where to see the new Tarantino's film, she would have read the newspaper.

Yet, some time ago she began to use a good search engine (let us call it GO) and realized that she could save a lot of time and get information that turns out to be true most of the time. Every time she cannot remember some bit of information, Cristina asks GO. In fact, she has discovered that the output of a query is generally satisfying even with fragmentary inputs; actually, she is becoming more and more lazy and tends to enter just some query fragments.

Cristina also bought a smartphone, in order to remain connected the whole day, and immediately installed GO on it. Now she has GO as her homepage on both the computer and the smartphone. Every time she is invited to her friends' homes for dinner, at some point in the evening someone inexorably asks

some odd question, about something like a rock star from the good old days, or the exact location of some historical village in Turkey. Immediately, not only Cristina, but also her friends – indeed, Cristina has discovered that almost everybody has GO installed on his /her smartphone – ask GO, and most of the time everybody is satisfied by the answers. Just a curiosity: are your friends so different from Cristina?

My hypothesis is that, *if* one subscribes to the *Extended Mind Model*, GO is a better example of the extended mind.

Some caveats

Somewhat surprisingly, Clark³⁴ is skeptical about the possibility of extending the mind by means of search engines such as GO. In his view, even the most advanced search engines fail to satisfy both the second and the fourth criterion for extending the mind. Now, we already noticed that the fourth criterion, concerning past conscious endorsement, is doubtful, as it seriously underestimates the importance of subconscious processes.

Concerning the second criterion, I believe that Cristina, whose attitude towards GO is perhaps epistemologically hazardous but who uses GO more and more frequently, does automatically endorse GO's results. This is a typical heuristic attitude in everyday thinking: Cristina uses GO to get information that she implicitly considers reliable on average, and that she will verify only if she has time and strong reasons to do so. Actually, on some occasions she uses GO not to get new information, but somehow to “defy” the system, checking on its truthfulness.

For example, while Cristina remembers very well that in their first recorded version of *Scarborough Fair* Paul Simon and Art Garfunkel nested a pacifist song (*Canticle*) which is no longer present in their performance at Central Park, she wants to check if GO registered that information. And it did, with epistemic accuracy. Looking forward to the fu-

ture, the more fluid, automatic, intuitive and bidirectional GO will become – and the more GO will be able to approximate human choices – the more it will spontaneously provide a flow of information in a reasonable approximation of Clark’s second requirement.

Overall, GO seems to satisfy to a certain degree the requirement of transparency, which we took as a crucial, global constraint for extending the mind. The notion of transparency, as defined by Clark, focuses on the way we can make use of a tool, especially with respect to the possibility of an optimal integration of the computational flow. In this sense, Cristina and GO are optimally integrated: temporally (she is always connected), spatially (she always has her smartphone in her pocket), epistemologically (she trusts it).

Yet, a tool can also be transparent in a different, stronger sense, if we use it without realizing that it is not part of ourselves. And Di Francesco³⁵ rightly wonders whether an external process can ever become as transparent as “traditional” mental processes always are, or whether the notion of transparency is rather a sort of metaphor.

Even if I use my notebook or my smartphone as intensively and automatically as Otto does, it would still be reasonable to ask myself whether *that* annotation on the notebook *really* is *my* annotation, whereas it does not make sense to ask whether the content of my perception is really mine. Nevertheless, is it really absurd to suppose that Cristina (perhaps not now but in the future) takes GO’s decisions to be to a certain extent *her own* decisions?

Looking at how people, and not only adolescents, more and more intensively use such a tool, I am beginning to seriously doubt it. Reflecting on the possibility of a transparent use of GO introduces a new important question, concerning the possibility of having an extended *self*. Could a technological tool like GO become transparent in this second, self-related sense? I am inclined to see it as an open, empirical question, not as a theoretical impossibility.

Decisions and relevance

Let us put aside the problem of transparency, waiting for future decisive technological improvements. Or you can even suppose that GO will never be transparent in Di Francesco’s sense. Still, in my view, Cristina’s use of GO represents an interesting step towards the extension of the self, provided that we focus on the fact that the self is a complex entity, *some* aspects of which could be extended out of the skull. What seems crucial to me is that Cristina relies on GO not only to store data (as Otto does) or to make inferences (as Mary-and-her-cash-register do, limited to the algebraic domain), but also to take certain decisions, especially those concerning the analysis of informational *relevance*.

In cognitive sciences the notion of relevance is tied to Dan Sperber and Deirdre Wilson’s research.³⁶ In the first instance, a piece of information is relevant for someone in a certain context if it produces a cognitive benefit: *ceteris paribus*, the more cognitive benefits information produces, the more it is relevant, where cognitive benefits are measured in terms of mental representations made available to other cognitive or perceptual processes.

Nevertheless, looking for information also has a cost, in terms of inferential, attentional and mnemonic resources. *Ceteris paribus*, the more intense the cognitive effort necessary to get information, the less relevant the stimulus will be. Thus, the optimal level of relevance is attained when costs and benefits reach a good balance. While it is impossible to enter into the many technical details of the *Relevance Theory*, it could be useful to present the spirit of the approach through an example.³⁷ Imagine a conversational excerpt like the following:

Andrew: “Would you drive a Mercedes?”

Barbra: “I wouldn’t drive any expensive car”

Why did Barbra not answer with a simple “No”, which, from a Gricean point of view,

would have perfectly respected the four conversational maxims? Is her lengthy answer somehow reasonable? Or perhaps, for some reason, is it even more reasonable than a simple “No”?

Maybe *in this context* this is the case. After all, Andrew is not specifically interested in Mercedes *per se*, but has a more general interest in knowing his friend’s attitudes, her personality better. And Barbra gives him optimal cues, because with a little effort now Andrew can infer that:

Barbra would not drive any expensive car.
A Mercedes is an expensive car.
Thus, Barbra would not drive a Mercedes.

At the same time, making a supposition about Barbra’s encyclopedic knowledge, Andrew also infers that Barbra would not drive, for instance, a Ferrari, Porsche, Maserati, or another expensive car. It is a bet that Barbra is making in giving her answer: she is supposing (but cannot be sure) that Andrew will benefit from her very informative but somehow expensive answer – for example, he will learn some important facts about her preferred lifestyle.

A rather different situation would have been created by a different answer, such as

Barbra: “I wouldn’t drive any expensive car and ($5 + 5 = 10$)”

In this case the same set of semantic inferences concerning car preferences would have been drawn; but the second conjoint – the algebraic expression – would have required an extra cognitive effort quite unjustified *in the context created by the question*. Clearly, $5 + 5 = 10$, but this algebraic fact has no useful role in the context of the conversation.

Going back to *Cristina*, when she enters one or more keywords, she has a good chance that *GO* will select a piece of information which everybody would have considered relevant (in Sperber and Wilson’s technical sense)

had Cristina obtained it in “the old way” (by checking in the encyclopedia on the shelf, asking experts, etc.). An example could help to clarify this point. It again concerns Simon and Garfunkel, together with J.S. Bach and Martin Luther.

Simon and Garfunkel

Cristina suspects that Simon and Garfunkel wrote a song which is based on a well known Lutheran chorale, famously exploited by J.S. Bach. But she cannot remember that song’s title, so she tries to ask *GO*, entering “Simon Garfunkel Bach”. Immediately, *GO* selects as the preferential entry the following Wikipedia’s page: “*American Tune* is a song written and first performed by Paul Simon”. Some lines after:

The tune is based on a melody line from a chorale from Johann Sebastian Bach’s *St Matthew Passion*, itself a reworking of an earlier secular song, *Mein G’müt ist mir verwirret*, composed by Hans Leo Hassler. The melody used for *American Tune* can be heard quite distinctly in part 1, number 21 and number 23 and in part 2, number 53. *American Tune*’s melody is practically identical to that of *Mein G’müt ist mir verwirret* and *O Sacred Head, Now Wounded*, although Simon expanded on the tune.

Many aspects of this answer are noticeable. First, *GO* has selected a Wikipedia entry, which on average is a reliable source of information.³⁸ Moreover, *GO* has not only picked up the *relevant* information for Cristina in that context (the song’s title: An American tune), but it has also selected information about something that Cristina (maybe out of laziness) did not mention in the query, but that was an important and *relevant* step in her thought process: the common reference to a Lutheran canon.

GO did not behave as a mere mnemonic tool, as would have been the case with the

encyclopedia on Cristina's shelf, as well as Otto's notebook. Rather, it has been capable of guessing what Cristina was interested in. It surely used no magic nor genuinely intentional intuition: after all, its answer is the outcome of an algorithm which (1) has been created by a team of human programmers, and (2) is capable of learning the users' preferences and areas of interests.

Nevertheless, what is important for us is just that GO had the same intuitions as Cristina, who for her part did not make any effort in order to make this relation explicit. I suspect that with time Cristina, realizing GO's enormous potentiality, will become even more lazy and distracted in formulating her queries. For example, if in a hurry, or simply a bit ignorant, she erroneously would have typed "Simon Garfunchel Bach", the answer would have been (you can try yourself): "Showing results for Simon **Garfunkel** Bach (the bold is on the GO page)", followed by the same entries (in the same order) as before.³⁹ In that situation, GO is able not only to attribute a sense to a question containing a mistake, but also to select a relevant and correct answer.

Overall, faced with fragmentary and insufficient inputs GO tries – and very often succeeds – in "understanding" what Cristina wants to know, and selects results that generally satisfy her expectancies. One would be tempted to say that GO is able to guess what Cristina is trying to look for and to find the piece of information which is most relevant for her in the context.

Another way to reformulate GO's performance is to say that it is a skilled attentive mechanism, driving our attention to a focus that sometimes we are not even aware of looking for. This is a crucial point, because in envisaging the problem in this way GO comes close to solving the most serious difficulty in artificial intelligence: the *frame problem*. In other words, the algorithms contained in GO seem able to delimit a knowledge domain, thus making the process computationally tractable; this is notoriously a

task which is trivial for a person, but extremely difficult for a machine. Yet GO, being what is called a *second generation search engine*, implements a special process which is able to learn from experience as humans do.⁴⁰

Overall, Cristina's use of GO suggests that not only some important aspects of Cristina's mind, but also some aspects of Cristina's identity, could be extended. (Fortunately), Cristina is still the real ultimate agent of the process; she takes the upper-level decisions, but some other important choices are made by GO. We could say that, after a first step where Cristina asks the top level question, GO becomes an autonomous agent, capable of finding relevant responses to Cristina's concerns. And, as long as Cristina continues to gain confidence in GO's retrieval processes, she will probably increasingly delegate her decision-making powers, entering more and more fragmentary queries.

Surely, GO's decision-making procedures are different from ours, but this difference does not matter here. Unlike the "old" simulative artificial intelligence, the Extended Mind Model is not as much interested in "how" an artificial system solves a problem, but instead focuses on the results – and, obviously, on transparency.

How many Selves?

While possibly agreeing with the analysis developed up to now, one could observe that the most reasonable way of describing this situation consists in supposing that *two* distinct minds are involved: maybe – one could say – GO is too smart to be part of Cristina's mind (and identity); what it implements is a second, autonomous mind.

I do not agree with this objection. To fully appreciate the point it is useful to compare Cristina's case with a different situation. Suppose that, to resolve her worries about Simon and Garfunkel, Cristina asks someone – her father, for example. And suppose that, her father being a very educated person, as Cristina becomes more and more lazy, she

begins to ask her father to satisfy whatever intellectual curiosity she has. Actually, Cristina exploits her father as intensively as she uses GO.

In this situation, which explicitly recalls Diego Marconi's *lazy girls argument*,⁴¹ I would conclude that Cristina and her father still remain two autonomous minds, two distinct subjectivities. Yet, in the interaction between Cristina and GO the situation is *not* the same. Unlike Cristina, GO does *not* have a point of view, a subjective perspective. There is only one phenomenal perspective at play, there is no possible conflict between different points of view.

Even if I am inclined to endorse the argument from phenomenology, I will not discuss it here, since it is a controversial topic that would require a long investigation into the different positions held in philosophy of mind.⁴² I would just like to point out that, from the phenomenological point of view of *Cristina*, the possible extension of her mind through GO would be less interesting than the extension through Bach-y-Rita perceptual tools. Provided that – for the reasons previously noted – neither GO nor the optical tools feel, when using the first tool Cristina experiences only a mild *quale*, not comparable to the strong feeling provided by the use of Bach-y-Rita prosthesis.

If GO is to be taken as an extension of a biological mind, this is mainly for other reasons, concerning the decision-making dimension of the self. A distinctive phenomenology is typically associated with perceptual processes, and GO, differently from a Bach-y-Rita prosthesis, is not a perceptual system, but rather a decision maker, *i.e.*, a prototypical cognitive system.

But, again, the system (GO + Cristina) could implement at best an extended self, not an autonomous agent. On the one hand, GO does not have the top level capacity of autonomous decision to trigger a search process; on the other hand, once having processed the input string, it somehow substitutes itself for the user and goes inde-

pendently onwards. It does not perform the higher level work; but its contribution to the task is not at all negligible.

Conclusions

Contrary to Descartes, the self seems far from being a simple and indivisible entity, easily accessible to personal scrutiny. On the one hand, clinical and developmental studies show that interpersonal relations strongly modulate the quality of introspective access. On the other hand, the extended mind paradigm seems compatible with the idea that some important aspects of the self could also be extended to the physical world. This latter point acquires special importance when considering how widespread electronic tools such as GO will be in the future.

Afterword

I must confess that Cristina is not only GO addicted, but she also bought TOM, a route planner. It is fantastic, perfectly suitable for Cristina. She is (or maybe was) not very good in orienting, but now TOM solves most of her problems and has reduced her anxiety.

She used to get a feeling almost like vertigo when trying to orient herself on a traditional map, and needed to (mentally or physically) turn it around to find her position with respect to the road network. Now Cristina knows perfectly where *she* is, because TOM tells her in real time. She just has to give it some information, being careful not to make *too many* orthographic mistakes. In any case, TOM is prudent and always asks for confirmation, and only then calculates the best route according to the preferences Cristina provides (*e.g.*, the quicker/cheaper/panoramic route). At this point, TOM does not need any more assistance: it takes its decisions alone.

Somehow unfortunately, Cristina no longer knows (as she used to) if anything nice lies along her route, say a lake, a mountain,

the sea, a small village that would be worth visiting; but this seems to her an acceptable cost to pay.

Notes

¹ R. DESCARTES, *Meditation on First Philosophy* (1641), in: R. DESCARTES, *The Philosophical Writings of Descartes*, vol. II, edited by J. COTTINGHAM, R. STOOTHOFF, D. MURDOCH, Cambridge University Press, Cambridge 1984, pp. 9-62, here p. 22.

² *Ivi*, p. 59.

³ See A. DAMASIO, *The Feeling of What Happens*, Harcourt Brace, New York 1999.

⁴ See U. NEISSER, *Five Kinds of Self-knowledge*, in: «Philosophical Psychology», vol. I, n. 1, 1988, pp. 35-59.

⁵ *Ivi*, p. 39.

⁶ See G.H. MEAD, *Mind, Self and Society from a Standpoint of a Social Behaviorist*, Chicago University Press, Chicago.

⁷ See L.S. VYGOTSKY, *Consciousness as a Problem in the Psychology of Behavior* (1925), in: «Soviet Psychology», vol. XVII, n. 4, 1979, pp. 3-35.

⁸ The term “scaffolding” (which, contrary to what is generally believed, was never used by Vygotsky, but was introduced by Bruner) denotes a method of teaching that involves providing support to students in their “zone of proximal development”.

⁹ *Ivi*, p. 30.

¹⁰ See G. GERGELY, J.S. WATSON, *Early Social-emotional Development: Contingency Perception and the Social Biofeedback Model*, in: P. ROCHAT (ed.), *Early Social Cognition*, Erlbaum, Hillsdale (NJ) 1999, pp. 101-137.

¹¹ See L.R. BAHRICK, J.S. WATSON, *Detection of Intermodal Proprioceptive-visual Contingency as a Potential Basis of Self-perception in Infancy*, in: «Developmental Psychology», vol. XXI, n. 6, 1985, pp. 963-973.

¹² Most autistic children continue to prefer the perfectly contingent situation. To the extent that autistic spectrum disorders are strongly associated with social deficits, their lack of reversal of the pattern of preferences turns out to be particularly meaningful.

¹³ See C. TREVARTHEN, *The Self Born in Intersubjectivity: An Infant Communicating*, in: U. NEISSER (ed.), *The Perceived Self*, Cambridge University Press, New York 1979, pp. 121-173; D.N. STERN, *The Interpersonal World of the Infant*, Basic Books, New York 1985.

¹⁴ See D.N. STERN, *Forms of Vitality: Exploring*

Dynamic Experience in Psychology, the Arts, Psychotherapy, and Development, Oxford University Press, Oxford 2010.

¹⁵ See G. GERGELY, J.S. WATSON, *The Social Biofeedback Model of Parent Affect Mirroring*, in: «International Journal of Psycho-Analysis», vol. LXXVII, Pt. 6, 1996, pp. 1181-1212

¹⁶ See D.N. STERN, *The Interpersonal World of the Infant*, cit.; C. TREVARTHEN, *The Self Born in Intersubjectivity: An Infant Communicating*, cit.; A. GOPNIK, A.N. MELTZOFF, *Words, Thoughts, and Theories*, The MIT Press, Cambridge (MA) 1997.

¹⁷ The social biofeedback process would also function through the mediation of the contingency detector, see G. GERGELY, J.S. WATSON, *The Social Biofeedback Model of Parent Affect Mirroring*, cit.

¹⁸ For details, and specifically for a hypothesis about the role of marking, see G. GERGELY, J.S. WATSON, *The Social Biofeedback Model of Parent Affect Mirroring*, cit.

¹⁹ See J. BOWLBY, *A Secure Base. Clinical Applications of Attachment Theory*, Routledge, London 1980; G. LIOTTI, *Disorganized Attachment Models of Borderline States, and Evolutionary Psychotherapy*, in: P. GILBERT, K. BAILEY (eds.), *Genes on the Couch: Explorations in Evolutionary Psychotherapy*, Routledge, Hove 2000, pp. 232-256.

²⁰ See G. LIOTTI, *Disorganized Attachment Models of Borderline States, and Evolutionary Psychotherapy*, cit.

²¹ *Ibidem*.

²² W. JAMES, *The Principles of Psychology*, vol. I, Harvard University Press, Harvard 1890, pp. 293-294.

²³ *Ivi*, p. 291.

²⁴ See A. CLARK, D. CHALMERS, *The Extended Mind*, in: «Analysis», vol. LVIII, n. 1, 1998, pp. 7-19.

²⁵ See e.g. A. CLARK, *Supersizing the Mind*, Oxford University Press, Oxford 2008; R. MENARY (ed.), *The Extended Mind*, The MIT Press, Cambridge (MA) 2010.

²⁶ Vygotsky notoriously claimed that external props modulate the way a child solves a problem, see L.S. VYGOTSKY, *Thought and Language* (1934), The MIT Press, Cambridge (MA) 1962.

²⁷ A. CLARK, D. CHALMERS, *The Extended Mind*, cit., p. 8.

²⁸ See A. CLARK, *Supersizing the Mind*, cit.

²⁹ See e.g. S. GALLAGHER, *The Socially Extended Mind*, in: «Cognitive Systems Research», n. 25-26, 2013, pp. 4-12.

³⁰ See P. BACH-Y-RITA, C.C. COLLINS, F. SAUN-

DERS, B. WHITE, L. SCADDEN, *Vision Substitution by Tactile Image Projection*, in: «Nature», n. 221, 1969, pp. 963-964.

³¹ See, e.g., S. OBAYASHI, T. SUHARA, K. KAWABE, T. OKAUCHI, J. MAEDA, Y. AKINE, H. ONOE, *Functional Brain Mapping of Monkey Tool Use*, in: «Neuroimage», vol. XIV, n. 4, 1998, pp. 853-861.

³² See A. CLARK, D. CHALMERS, *The Extended Mind*, cit.

³³ See J. LOCKE, *An Essay Concerning Human Understanding* (1690), Oxford University Press, Oxford 1875.

³⁴ See A. CLARK, *Supersizing the Mind*, cit.

³⁵ See M. DI FRANCESCO, *Extended Cognition and the Unity of Mind. Why We are not "Spread into the World"*, in: M. MARRAFFA, M. DE CARO, F. FERRETTI (eds.), *Cartographies of the Mind*, Springer, Berlin 2007, pp. 211-225.

³⁶ See D. SPERBER, D. WILSON, *Relevance. Communication and Cognition*, Blackwell, Oxford 1986.

³⁷ *Ivi*, p. 194.

³⁸ See C. MEINI, *Giovani forme di conoscenza, Wi-*

kipedia, in: D. CORNO, U. CARDINALE (a cura di), *Giovani oltre*, Rubbettino, Soveria Mannelli 2007, pp. 295-315.

³⁹ In order to avoid GO's learning (which is an obviously an aspect of the human mind, but should be put apart in this "experiment"), Cristina made her second search on another computer.

⁴⁰ See J. KLEINBERG, *Authoritative Sources in a Hyperlinked Environment*, in: «Journal of ACM», vol. XLVI, 1999, pp. 1-33.

⁴¹ See D. MARCONI, *Contro la mente estesa*, in: «Sistemi Intelligenti», vol. XVII, n. 3, 2007, pp. 389-398; M. DI FRANCESCO, *Extended Cognition and the Unity of Mind. Why We are not "Spread into the World"*, cit.

⁴² Dennett, for example, argues that our same feeling of being an agent is nothing but an illusion of the Cartesian theater, having no ontological reality. In that case, Cristina, her father and GO would all belong to the same ontological category. See D.C. DENNETT, *Consciousness Explained*, Little Brown and Co., Boston 1991.