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Developmental Phenomenology: Epistemic Grounding, Infant Imitation, and Pairing

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DEVELOPMENTAL PHENOMENOLOGY: EPISTEMIC GROUNDING, INFANT IMITATION, AND PAIRING

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ABSTRACT

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The present dissertation is comprised of three chapters. While the first chapter confines itself to Husserlian phenomenology, the other two pull together phenomenology and cognitive science, especially developmental psychology. Each chapter is an autonomous paper. However, the second and the third chapters are clearly connected. The claim defended in the second chapter figures as a premise in the third, and so the former chapter constitutes a part of the project that is carried out in the latter. Moreover, I show that there are deeper connections among all three chapters, which I explore in the introduction and in the conclusion.

In the first chapter, I argue that the phenomenological reduction makes possible a viable solution to the epistemological problem of whether the belief in the world's existence is justified. The chapter includes a relatively long exegetical section aimed at demonstrating that the problem of the epistemic ground for the world's existence constitutes one of Husserl's motivations for the phenomenological reduction. After the exegetical section, I clarify the key distinction between immanence and transcendence and present an argument for the possibility of propositions about experience that do not presuppose the world's existence. In the second chapter, I propose the association by similarity hypothesis for neonatal imitation. This phenomenon is at the center of heated debates involving psychologists and philosophers. By relying on the basic, far-reaching character of association by similarity, I propose that modeled acts reawaken specific motor habits that begin to be acquired during the prenatal period. I argue that this

hypothesis has various advantages over the hypotheses that currently dominate the debate. In the third chapter, I claim that infants come to perceive others as minded beings on the basis of an association by similarity between the behavior of others and their own. This claim constitutes a significant application of the "theory of pairing," which was endorsed in its core by both Husserl and Merleau-Ponty. I discuss the preconditions of pairing in the order of development: motor experience, association, and innate predispositions. Neonatal imitation, explained in light of the association by similarity hypothesis, bares witness to the early functioning of these preconditions. I examine action perception in infants and I argue that pairing occurs in infant-caregiver interaction.

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INTRODUCTION

1. What is the dissertation about?

The dissertation is about epistemic grounding, neonatal imitation, and the theory of pairing. These are three distinct topics, which correspond to the three chapters composing the dissertation. Each chapter is an autonomous paper, and argues for its own specific claim. However, the second and the third chapters are closely connected. The claim defended in the second chapter figures as a premise in the third, and so the former chapter constitutes a part of the project that is carried out in the latter.

In addition to the direct link between the last two chapters, there are connections between all three chapters. Indeed, although they are about different topics, each chapter strengthens the others. Thus, the introduction and the conclusion explore the connections between the three chapters. While the introduction raises the problems, the conclusion collects the fruits. I begin with a brief presentation of the three chapters. This will provide an idea of the combination they form.

In the first chapter, I argue that the phenomenological reduction makes possible a valuable solution to the epistemological problem of whether the belief in the world's existence is justified. The definition of the phenomenological reduction is taken from Husserl, as well as all the resources employed to formulate the solution to the epistemological problem. The chapter includes a relatively long exegetical section aimed at specifying one of the motivations for the phenomenological reduction. Husserl indicates that the reduction is required in order to avoid circularity in providing the epistemic ground for the world's existence. After the exegetical section, the chapter clarifies the key distinction between immanence and transcendence and presents an

argument for the possibility of propositions about experience that do not presuppose the world's existence. The Husserlian solution is contrasted with more prevalent contemporary ways of thinking with respect to the same problem. The chapter is guided by the thought that, if Husserl's solution is self-consistent and capable of withstanding major objections, then it represents a position that cannot be neglected in epistemological debates.

In the second chapter, I propose the association by similarity hypothesis for neonatal imitation. This phenomenon has generated heated debates among developmental psychologists and is often discussed by philosophers and neuroscientists. Indeed, neonatal imitation is referred to in a number of different discussions about, for example, the origins of imitation, social cognition, communication, visual-motor coordination, and nativism. Much seems to be at stake in regard to this phenomenon, but there is no consensus about its nature. Scientists disagree on whether the experimental findings are substantial and also on how to explain them. My association by similarity hypothesis represents a novel contribution to the debate. Although its main idea is relatively simple, it has not yet been proposed as an alternative explanation. In my view, the main reason for this notable lacuna is the dominance of Andrew Meltzoff's Active Intermodal Matching model (AIM). Such a computational model over-intellectualizes the neonate's cognitive operations. In contrast, simple principles familiar to the practitioner of phenomenology provide a more plausible and parsimonious explanation, which also better account for the variability of the findings. Hence, the chapter specifies why, given the findings currently available, the association by similarity hypothesis should be preferred. A notable consequence of the association by similarity hypothesis is that

neonatal imitation cannot be understood to be an episode of social cognition in the sense provided by Meltzoff.

In the third chapter, I claim that the phenomenological theory of pairing accounts for how infants come to experience others as minded beings. By "theory of pairing" I mean a view that was endorsed in its core by both Husserl and Merleau-Ponty. In the chapter I take the core of this view and I test it against developmental findings. I discuss the preconditions of pairing in the order of development: motor experience, association, and innate predispositions. Neonatal imitation, explained in light of the association by similarity hypothesis, is not an instance of pairing, but rather bares witness to the early functioning of its preconditions. Moreover, I examine different positions on the problem of when in development infants perceive others as minded beings (at birth? At six weeks? At nine months?). Finally, I discuss action perception in infants and I suggest that pairing occurs in infant-caregiver interaction. Rather than being contrasted with traditional accounts such as Theory Theory or Simulation Theory, the theory of pairing is contrasted with nativist views of mental state attribution. Indeed, the theoretical opposition between pairing and nativism is more significant for phenomenological debates on intersubjectivity.

To recapitulate, the dissertation is composed of a chapter in Husserlian phenomenology and two interdisciplinary chapters pulling together phenomenology and cognitive science. Despite the fact that the last two chapters form a unity with regard to both content and method, there are differences between the two. The chapter on neonatal imitation is a paper in cognitive developmental psychology. It provides an explanatory model that is directly comparable with the explanations currently proposed by

psychologists. In this chapter, phenomenology plays a merely inspirational role. In the chapter on paring, however, phenomenology is an integral part of the investigation's methodology. That is to say—I also investigate phenomenological questions. Specifically, I practice an empirical and reconstructive "phenomenological psychology" that makes use of empirical data to formulate a plausible hypothesis about the dynamics of the infant's "lived experience." At the same time, I claim that the theory of pairing is capable of modeling the origins of mental state attribution in the terms of cognitive psychology. The theory can thus be read as a theory of cognitive processing, without implying a reference to lived experience. Because the third chapter offers itself to a twofold reading—as providing both a phenomenological-psychological reconstruction and a cognitive-developmental model—it is probably the most ambitious of the three.

The original motivation for my research on neonatal imitation and infant social cognition was to be able to substantiate particular phenomenological claims in a more effective way. It was clear that developmental psychology had something to say to phenomenology. That phenomenologists frequently mention infants or children to exemplify their claims was an indication of the fruitfulness of studying the empirical literature. However, I soon made a discovery that added complexity to the kind of intellectual work I was pursuing. There is no monolithic and concordant developmental psychology to which a phenomenologist can simply refer as a set of scientifically proven propositions. To significant debates in phenomenology, there correspond significant debates in cognitive psychology. In general, philosophers run the risk of reporting only the findings that confirm their own theories and ignoring the complexity of the scientific

field. For this reason, it was imperative for me to address the details of empirical and theoretical issues in cognitive psychology as much as possible.

A result of such involvement with the details of cognitive science was the realization that, in light of phenomenological principles, one can not only provide a philosophical interpretation of empirical findings; one can also formulate original, competitive hypotheses for the field of cognitive science. An example of this is the association by similarity hypothesis for neonatal imitation. Another example concerns the origins of mirror neurons and will be discussed in the conclusion. In my view, these hypotheses have not yet received attention because theorizing in cognitive science is framed by assumptions that obscure valid theoretical alternatives. Obviously, there is still a lot of work to do to make these hypotheses acceptable for cognitive scientists and perhaps even capable of guiding their research. Nonetheless, I have enough reasons to believe that it is worth devoting my efforts to the strengthening of these hypotheses—something I am currently doing in collaboration with cognitive scientists at the University of Memphis.

To give an idea of how developmental psychology can have implications for phenomenology, in the next section I introduce Husserl's method of eidetic variation and discuss what it entails for phenomenological propositions. I also explain how one can derive counterexamples to phenomenological propositions starting from empirical facts. In the subsequent sections, I examine a central point of connection between the three chapters and I explicate preliminary distinctions.

2. Eidetic Variation, Counterexamples, and Empirical Science

Although not all authors in the phenomenological tradition endorse Husserl's version of eidetic variation, what they do not dismiss is the idea that it is possible to gain insights into the structure of experience. Phenomenologists tend to think that philosophy can achieve valuable general insights into the different kinds of experience and knowledge. Husserl's eidetic variation is a method to produce such general insights. Specifically, it is the process of examining imagined instances of a given kind in order to grasp the invariant features that apply to all its possible instances. The process starts with a single instance that is then varied in non-arbitrary ways to produce other instances to be examined. As Husserl practiced it, eidetic variation included the effort to identify single instances of a general kind that can falsify universal assumptions hastily believed to be valid.

For Husserl, the propositions of transcendental phenomenology are "eidetic" (from "*eidos*," essence). This means that they apply to all possible cases of a given kind. If an instance of a kind does not instantiate the structure that is predicated of all instances by the eidetic proposition, then the proposition is falsified, i.e. it is not eidetic at all. When a proposition is claimed to be eidetic, it is claimed that there are no possible counterexamples to it.

Now, the theory of paring is a proposition of transcendental phenomenology. The original motivation behind the second and the third chapters was to investigate whether a particular instance of intersubjective experience could count as a counterexample to the theory of pairing. The particular instance was the infant's experience of others as minded beings. From the start, it seemed that this instance would have been very helpful in

showing the general validity of pairing if it had proved to be an instantiation of it. Indeed, the perception of the other that an adult human being has is shaped by a history of previous acts of social understanding. Pairing might not be so visible in the experience of the adult human being, but it is still a precondition of her experience insofar as it was necessary to make intersubjective experience possible in her past. The infant's case may enlighten the way in which pairing made the perception of the other possible in our past. Moreover, given certain qualifications, the infant's experience may provide the starting example for the process of eidetic variation. In other words, the infant's case seemed able to open the scope of reflection in an effective way and put us in a better position for judging on whether pairing applies to all possible cases. Although it was clear that a single case verifying an eidetic proposition does not decide its truthfulness, it appeared that the case of the infant could be very stimulating.

As I show in the third chapter, developmental psychologists claim that humans start perceiving others as minded beings in infancy. For example, they provide evidence that infants perceive others as endowed with intentions, perceptions, and emotions. Assuming that developmental psychologists are right, the infants' experience of others as minded beings counts as a factual instance of intersubjective experience. Yet, in its Husserlian formulation, eidetic variation is not concerned with factual instances. Eidetic variation targets all possible instances, i.e., all instances of a kind whether they are actual or not. Accordingly, a factual instance can be examined in the process of eidetic variation only if it is stripped of its factuality and considered on an equal footing as any other possible instance that can be imagined. This qualification is important because a single instance cannot have any privilege over other instances. That certain instances are actual

must not mislead us. It must not prevent us from investigating instances of the same kind that can only be imagined. Consequently, a phenomenologist engaged in eidetic variation can profit from an empirical case only if she transmutes it in a purely imaginary case, in a "pure possibility." I do not find this transmutation to be particularly problematic. An instance of experience that is posited as real and as endowed with certain characteristics can thereby be imagined as having those characteristics. After all, this is nothing more than a way to reinterpret the old scholastic principle "*ab esse ad posse valet illatio*" (the inference from being to possibility is valid).

Because Husserl claimed that the propositions of transcendental phenomenology are eidetic propositions, one is led to interpret the theory of pairing as a proposition that can be established through eidetic variation. If the infant's experience proves to be a counterexample, then either the method has been executed incorrectly (i.e. pairing is not truly universal, but the method is capable of producing other truly eidetic propositions) or the method is in itself deficient and believing that eidetic variation can provide us with universal truths is an illusion. In the first case, Husserl would have failed to provide a correct account of the eidetic structure of intersubjectivity. In the second case, Husserl would have not been aware of the deficiencies of his method.

If, on the contrary, the infant's experience does verify the theory of pairing, then the examination of this particular instance might initiate and facilitate a process of eidetic variation. The infant's experience—transmuted in pure imaginary possibility—might help us imagine other examples in which pairing applies and so quicken the process by which one can grasp pairing as a truly necessary structure. Or, although it shows that pairing likely applies to infants, the discussion of the developmental data and their

explanatory models might have suggested possible dynamics of intersubjective experience that do not instantiate pairing. In this case, though verified as an empirical proposition about infants, pairing would have been falsified as an eidetic structure of intersubjective experience. A result of this kind does not have to be interpreted as a sign of the impracticability of the eidetic method; it might simply be an indication that the generality of the theory of pairing has to be reappraised.

In short, my inquiry into infant's experience should be considered against the background of the phenomenological search for the invariants of experience. In itself, the examination of an empirical case may have no meaning for a question about necessary structures. However, if the empirical case is integrated in a philosophical consideration of general structures, then its results can be particularly illuminating precisely in view of the goals of the philosophical investigation. In the Husserlian framework, a move of this kind implies requalifying the empirical instance as a pure imaginary possibility. This pure possibility must then be inserted in a process of eidetic variation that eventually will discriminate true from false invariants.

In the background of the second and the third chapters stand the following questions: Is pairing a necessary structure of intersubjective experience? Can it be established through eidetic variation? Although it is argued that pairing accounts for the infant's case, the last two chapters contain considerations—specifically, considerations about nativism—that point to the possibility of experiencing others as minded beings without making use of pairing. Therefore, the last two chapters suggest that the answer to those background questions is no. Although pairing applies to infants, it does not apply to

all possible cases of intersubjective experience. I will come back to such issues in my concluding remarks.

It is important to emphasize that there can be no arbitrary limit to the use of imagination in eidetic variation. The simple fact that an imaginary example appears strange and abstruse, and that we can be confident that it will never be actualized, does not make it insignificant for the purposes of the variation. The goal of eidetic variation is to identify features that are present in all possible instances of a kind, whether they are actual or not. A strange and abstruse exemplar can count as a counterexample to an alleged eidetic claim just as much as an exemplar derived from actual experience. Imaginary examples can even be grotesque, but if they count as exemplar of their given kind, they must be accounted for by eidetic propositions.

This radicalism with respect to the use of imagination corresponds to the unprejudiced openness of phenmenological investigations. Examples can be derived from any field of human activity: science, art, literature, historical research, religion, etc. For instance, descriptions of the Nirvana in Buddhism might help us identify a certain kind of experience, which we would have neglected otherwise. We can then use that kind of experience to test claims about more general kinds of which it is a subspecies. Or, perhaps, we can use that kind of experience to test claims about experience in general.

One of the motivations for my involvement with cognitive science was that this field often solicits phenomenologists to think about instances of experience they would not consider otherwise. Even if perhaps in theory it is possible to identify those instances without any input from the empirical sciences, in actual fact such an input happens to be particularly efficacious. In my conclusion, I will point out how the study of

developmental psychology obliged me to think about possibilities I would have otherwise neglected.

3. Two Eidetic Propositions I Take as Assumptions

Before I present the problem cutting across all three papers, I shall now state two propositions that I endorse as being eidetically valid. Contemporary phenomenologists have defended these two propositions convincingly. They constitute background assumptions of the views I argue for in this dissertation.

1. Consciousness entails self-consciousness, at least in the pre-reflective form (Zahavi, 2014).

In substance, this proposition posits the ubiquitous character of a minimal form of self-consciousness. This minimal form is implicit or pre-reflective, but is nonetheless essential. Every conscious experience is also experienced, given, lived. Self-awareness is the most direct, "original" way in which experience can be present to a subject (Husserl).[1]

2. Only a subject that is (pre-reflectively) acquainted with its own experiences can attribute experiences to others. "It takes one to know one" (Nenon, 2002, p. 12).

This proposition asserts the following: when I experience the other there is a reference to my own experience. Such a reference is a phenomenological nexus of implication. The other is another experiencer, i.e. something of the kind that I also am. To the phenomenological meaning "other" belongs a core of meaning that I have experienced in myself, i.e. "being an experiencer." In other words, something can appear to me as another experiencer only because I know what an experiencer is from my own

[1] Perhaps it would be better to say that self-awareness is the givenness of experience in "flesh and blood." Recollection of a past experience can be considered as givenness in flesh and blood (it is first-personal), but is not original because it is derivative with respect to the present.

experience. Thus, another experiencer can only be an experiencer of the same kind that I am. Without experiencing myself, I could not know about any experiencer. As Nenon (2012) puts it, self-awareness provides "the basis for the constitution of a region of beings with anything like a mental life at all" (p. 12).

This does not at all mean that the other is an extension of myself. To the phenomenological meaning "other" belongs the meaning "someone who is not me." An experience of an extension of myself is not an experience of the other. The other is not me, but is an experiencer of the same kind. Proposition 2 says that self-awareness comes first. The perception of the other comes second and depends on the first. It is as if consciousness made use of the givenness of experience to itself as a resource to produce the act of "intending" someone else.[2]

It is important to distinguish the second proposition from the notion of pairing. Pairing is a more specific claim. It adds that the perception of the other as a minded being requires an association by similarity between my own (acting) body and the other's (acting) body. Nothing like that is entailed in the mere idea that "it takes one to know one." To repeat, proposition 2 is that an experiencer can experience another experiencer only in virtue of the acquaintance it has of itself as experiencer. A subject can perhaps directly perceive the other's lived experience without requiring an association by similarity with one's own body. However, this subject would perceive the other's experiencing as an experiencing, i.e., as something of the kind it has experienced in itself. Therefore, in this case, the experience of the other would imply a reference to one's own

[2] Husserl understands consciousness to be productive in deriving the consciousness of the just past (retention) from the consciousness of the present (original impression). However, as De Warren (2008) insightfully elucidates, the alterity that is involved in generating the intention of someone else's experience (empathy) is even more radical.

experiencing, but not a reference to one's own body due to the similarity with the other's body: no pairing. Although pairing is true only if proposition 2 is true, the latter could be true even if the former is false.

I will return to the distinction between proposition 2 and pairing in my concluding remarks. For the time being, it suffices to have stated that the two are not equivalent.

4. The Question Cutting across the Three Chapters

There is a phenomenological question that plays an important role in all three chapters. The question can be phrased as follows: is it possible to have an experience that constitutes no world?[3]

In the formulation of the question the term "constitution" has to be understood in the phenomenological sense. "Constitution" means the manifestation of something as qualified in certain ways; it is another name for the intentional experience of something. Because the world is experienced as existing, as "being there," the question entails the idea of a positing of factual existence. Consequently, the question can be phrased in other equivalent ways: Is a flux of experience in which no world is manifested possible? Is a stream of consciousness that posits no world possible?

Evidently, the meaning of the question depends on the meaning that we assign to the term "world." In this dissertation, I take the term "world" to indicate the core content of what Husserl describes as "the natural attitude." The natural attitude is a basic structure of experience that supports practical life, culture and science. Most human

[3] A consequence of asserting the necessity of self-awareness for experience in general is that all experience is intentional. The universal structure of inner time consciousness implies intentionality. For this reason, I do not formulate the question as "is it possible to have an *intentional* experience that constitutes no world?" The addition of the adjective "intentional" would not be particularly relevant, at least not at this point. I take "experience" to be synonymous with "manifestation," and I take manifestation to be always manifestation *of* something. In a manifestation, something is manifested, be it manifestation itself. The same holds for the notion of appearing (*Erscheinen*).

beings instantiate this structure of experience and it is an open empirical question whether other beings do it too. Husserl (1982) provides a precise characterization of the core content of the natural attitude: "the one spatiotemporal actuality to which I belong like all other human beings who are to be found in it and who are related to it as I am" (pp. 56-57).

In this characterization, the two minimal structural features of the phenomenon "world" are clearly stated: spatiotemporal actuality and intersubjectivity. One could argue that causality as the (regulated) dependence of spatiotemporal objects is also a structural feature of the core content of the natural attitude and so defines a necessary constituent of the notion of world. However, for the purposes of this dissertation, it is sufficient to be guided by the two features mentioned in Husserl's statement. The world is not only a spatiotemporal reality and so the opposite of an illusion, but also an intersubjective phenomenon. The world is "there-for-everyone." Precisely, the relationship between world and intersubjectivity is one of co-implication. There is no world without intersubjectivity and there is no intersubjectivity without world. For this reason, the question of whether an experience that posits no world is possible is equivalent to the question of whether it is possible to have an experience that posits no intersubjectivity. One cannot answer one of the two questions without answering the other as well. These two questions denote one and the same problem.

The notion of world so delineated does not capture the entire meaning of the word "world" in ordinary language. Nor does it play a role in all philosophical issues that are discussed by making use of the word "world." However, our notion of world does indeed pick up a significant part of the ordinary meaning of the term and is also philosophically

pregnant. As I show in the dissertation, this notion is involved in crucial epistemological problems and in the investigation of the origins of intersubjective experience. Let me then state what are the implications for my three chapters of the question "Is an experience that constitutes no world possible?"

In the first chapter, the answer to that question has epistemological consequences. Given the framework of transcendental idealism, the question ends up deciding the epistemological status of the belief in the world's existence. In Husserl there are different levels of apodicticity (i.e., incontrovertibility). If there is no experience without spatiotemporal actuality, then the fact that a spatiotemporal actuality exists is *sensu stricto* apodictic. In other words, the fact that a spatiotemporal actuality exists is incontrovertible in the highest philosophical sense, i.e., in the strictest and most radical sense. The reason for this is that, within the framework of transcendental idealism, existence is defined in terms of intentional experience. If any (and every) experience posits a spatiotemporal actuality, then the fact that a spatiotemporal actuality exists cannot be controverted by any possible future course of experience (although it is possible that the spatiotemporal actuality that really exists is totally different from the one which I currently believe to be the case). On the contrary, if it is not true that any (and every) experience posits a world, then that a spatiotemporal actuality exists is in theory controvertible. The consequence is that the belief in the world's existence does not enjoy the highest philosophical degree of apodicticity.[4]

[4] In addition to deciding the epistemological status of the world belief, in the first chapter the answer to the question on the possibility of "world-less" experience also plays another role. It supports an argument for the possibility of the special kind of propositions targeted by the phenomenological reduction.

Analogously, the question has important implications for the project unifying the second and the third chapters, i.e. the investigation of whether pairing accounts for how infants come to perceive others as minded beings. If the answer is in the negative, one is obliged to say that as soon as infants start having experience they also experience other minded beings (remember that the experience of the world implies intersubjectivity). When do infants start having experience? Usually, we perceive a newborn crying not as a robot bereft of lived experience. We perceive its behavior as expressing lived experience (empathy in the phenomenological sense). As we shall see, this attribution is confirmed by a number of scientific studies. If, then, one believes that there is no experience without intersubjectivity and accepts that a neonate has experience, then it is implausible that a neonate experiences others as minded beings because of pairing. How would pairing operate given that the infant has so little experience of its own body and of the body of the other? One then would have to opt for a nativist account of infant mental state attribution that is incompatible with the theory of pairing.

If, on the contrary, an experience that posits no intersubjectivity is possible, one can hypothesize that there is a period in development where the infant consolidates its experience *before* perceiving others as minded beings. In this period the infant could acquire enough experience of its own body and the body of others. At a certain point, the development of experience would make pairing possible, i.e. an attribution of lived experience based on similarity. Through a radical restructuration of an experience developed without intersubjectivity, intersubjectivity would come about. In other words, the possibility of a period of non-intersubjective experience strengthens the theory of

pairing because it gives the infant the time to develop the factors of experience without which pairing cannot occur.

To recap, I formulate the answers to the question "Is an experience without world possible?" in terms of phenomenological propositions. If a phenomenologist accepts a negative answer, then she commits herself to the following eidetic proposition:

N1: Experience essentially entails the positing of the world.

N1 is an eidetic proposition because it denies that an experience that posits no world is possible. No counterexample is imaginable. Since positing the world implies positing intersubjectivity, N1 is equivalent to N2.

N2: Experience essentially entails the positing of intersubjectivity.

In contrast, if a phenomenologist endorses a positive answer, she commits herself to:

P1: An experience that posits no world is possible.

We must bear in mind that P1 simply means that an experience that posits no world is conceivable. Indeed, in the framework of transcendental idealism, possibility is the same as conceivability—yet transcendental idealism allows one to distinguish between possibilities for which we have at least some reasons to expect that they will become actualized (real possibilities), and possibilities for which we have none (pure possibilities). Furthermore, we must keep in mind that we are operating with a particular notion of world. Thus, P1 is equivalent to P2.

P2: An experience that posits no intersubjectivity is possible.

In this dissertation, I endorse P1 and P2. I argue that an experience that posits no world and no intersubjectivity does not only exhibit the minimal requirements of "intentionality" (see footnote 3); it can also present significant degrees of organization.

Given our historical philosophical context, it could be suspected that endorsing P1 and P2 commits one to solipsism or to the downsides of Cartesianism. In the dissertation, I focus on making phenomenological insights accessible, so there are no extensive discussions specifically devoted to dispel these kinds of worries. Yet, in my exposition, I do seek to avoid generating associations in the reader that might obscure the conceptual framework that is really at stake.

5. Two Preliminary Distinctions

I would like to recall two more distinctions. These distinctions help clarify points that could not be sufficiently discussed in the respective chapters because of space limitations. They also help forestall possible objections. The first distinction concerns the first chapter whereas the second regards the second and third chapters.

In the context of the phenomenological theory of knowledge, one has to distinguish between "grounding" (*Begründung*) and "direct presentation" (*Aufweisung*). Grounding is the same as justification. In every instance of grounding, there is something that grounds and something that is grounded, something that justifies and something that is justified. Direct presentation is a subspecies of justification. In a direct presentation, what has to be justified is presented in itself, and it is through this presentation that its validity is exhibited. For example, mathematical axioms are known through direct presentation. When I have a clear insight into a mathematical axiom, I grasp that a general mathematical relationship obtains. What has to be grounded and what is doing the grounding coincide. Before the process of justification, the mathematical relationship is only "emptily intended," i.e., I understand the statement that expresses the axiom, but I don't know whether the axiom actually holds. In realizing the direct presentation, the

empty intention of the mathematical relationship is fulfilled by the mathematical relationship itself. That an axiomatic relationship holds means precisely that it can present itself in acts of insightful mathematical thinking.

The difference between grounding and direct presentation is that grounding also applies to processes of justification where the ground differs from the grounded. For example, in inductive or deductive arguments, premises justify a conclusion. Direct presentation corresponds to a specific style of justification. This specific style can be expressed by the simple invitation: "Look!" With regard to the world's existence, traditional skepticism (especially in modern philosophy) rejected such a way of justification because it claimed that what we see is just a mental picture, which gives us no guarantee of the external world. The transcendental idealism endorsed by phenomenologists rejects the assumptions of skepticism (e.g., that it makes sense to talk about a world beyond experience) and so restores direct presentation as the way in which the world's existence is certified. Existence is just a phenomenon of a specific kind. It is the fulfillment of an "intention"—which does not mean that in the genesis of experience the intention comes before the fulfillment. To ask whether the world exists is to ask whether something fulfills my world intention. The answer is very simple. I answer by looking around or by touching the table in front of me and feeling how well I am rooted in the world. In these acts, my world intention is fulfilled by the world itself. Look! Here is the world.

However, this is not the end of the story. For sure, this is not all that Husserl had to say, as I show in the first chapter. Most importantly, I think that the simple invitation to look does not fully clarify what grounds my belief in the world's existence. It is true

that it is the world itself that is presented in my acts of perception. Yet the world infinitively transcends each of my acts of perception. In perception, I intend the world as something capable of fulfilling an infinity of future acts. Am I justified in intending it that way? What, if anything, grounds the positing of the world as infinitely transcending my actual experience? My first chapter is motivated by the idea that, in order to address these questions, one has to go further than simply appealing to the direct presentation of the world. The ground of my belief must be further clarified.

The second distinction I would like to acknowledge concerns the project of the third and second chapters. It is the distinction between social cognition and theory of mind in cognitive science. For the most part, cognitive scientists use the term "theory of mind" to indicate the ability to ascribe mental states to others. Theory of mind is synonymous with mental state attribution. On the other hand, the term "social cognition" has a much wider application. It refers to social skills and to interactive processes that do not necessarily imply the attribution of mental states.

In this dissertation, I exclusively investigate low-level mental state attribution. It is correct to say that I investigate social cognition only because mental state attribution is an eminent part of social cognition. Nevertheless, it is important to emphasize that none of the claims I defend in this dissertation entails a specific definition of social cognition. When I reject Meltzoff's claim that neonatal imitation is an episode of social cognition it is not because I reject Meltzoff's conception of what social cognition is. Rather, I claim that the form of social cognition he has in mind (i.e., the recognition of similarities between self and other) does not apply to the phenomenon of neonatal imitation. I do think that the way cognitive scientists use the term "social cognition" (i.e., as broader

than theory of mind) is appropriate and fruitful, but I confess that I do not know how to define it. One problem with defining social cognition is how to discriminate cases of interaction between agents that count as social cognition from cases that most people would not consider as episodes of social cognition (e.g., breastfeeding). Hence I do not even know whether a clear definition of social cognition is possible.

Fortunately, I do not need a definition of social cognition because my only focus is mental state attribution. Such a restriction of the field of inquiry is not arbitrary. The expression "mental state attribution" tracks a phenomenon that has been of special interest to phenomenologists. This phenomenon is the experience of others as beings endowed with lived experience, i.e. as minded beings. For many phenomenologists, this is an essential aspect of what they call "intersubjectivity." In this dissertation, I use the language of mental state attribution interchangeably with more traditional phenomenological language. It is possible to do so, without necessarily incurring a misunderstanding, because both languages seek to account for the things themselves.

In order to clarify the terminology, it is helpful to quote a passage from section 55 of the *Cartesian Meditations*. The section is entitled "Establishment of the community [Vergemeinschaftung] of monads. The first form of Objectivity: intersubjective Nature" and begins with the following statements:

> But it is more important to clarify the community, developing at various levels, which is produced forthwith by virtue of experiencing someone else; the community between me, the primordial psychophysical Ego governing in and by means of my primordial organism, and the appresentatively experienced Other; [...] The first thing constituted in the form of community, and the foundation for

> all other intersubjectively common things, is the commoness of Nature, along with that of the Other's organism and his psychophysical Ego, as paired with my own psychophysical Ego. (Husserl, 1999, p. 120)

This passage contains indications of three basic features of what is implied by the term "intersubjectivity." First, there must be the experience of someone else. However, it is possible to experience someone else's body without experiencing that it belongs to someone. For intersubjectivity to occur it is not enough that one experiences the sensory features of the other's body (e.g., the color or the warmth of a surface of the body). It is necessary that the subjectivity of the other's body be experienced. The other must be experienced as a minded being, or, in other words, *there must be the experience of a plurality of subjects (as subjects)*. Second, the experience of a plurality of subjects belongs to at least one of the subjects of this plurality. This subject has a first-personal experience of its own experiences and of its own body, whereas it has a non-first-personal experience of the experience of others and of their lived bodies. If it experienced the other first-personally, there would be only one subject, no intersubjectivity. Third, the other experiences the same reality that the self experiences. It is not possible to experience the other as a minded being without perceiving her as experiencing the same world I experience. A common world must be experienced.

The main authors in the phenomenological tradition (Husserl, Heidegger, Merleau-Ponty, Sartre, etc.) imply these three features in using the term "intersubjectivity," even when they downplay the significance of the notion. These three features of intersubjectivity are not meant to exhaust what phenomenologists usually

mean. However, they constitute a sufficient characterization of the notion of intersubjectivity for how it is used in this dissertation.

This phenomenological notion does not coincide with the notions of primary intersubjectivity or secondary intersubjectivity as it is used in contemporary developmental psychology, although it is related to them. Whereas the interactions described as primary intersubjectivity do not necessarily entail intersubjectivity in the phenomenological sense (they do not require the infant to experience the caregiver as a minded being), secondary intersubjectivity identifies a level of intersubjectivity that is not the most basic instantiation of intersubjectivity in the phenomenological sense. That is: secondary intersubjectivity requires intersubjectivity in the phenomenological sense, but it is not the most basic form of intersubjectivity in the phenomenological sense (secondary intersubjectivity requires complex triadic interactions which do not represent the earliest stage of the experience of others as minded beings). I will say more about the relations between the phenomenological notion and the notions used in developmental psychology in the third chapter.

The phenomenological notion I just characterized is abstract and suggests the specification of different levels of intersubjectivity.[5] For example, a basic level of intersubjectivity is the experience of others as beings endowed with simple intentions, emotions, and sensory perception. A more complex level—which presupposes the basic one just mentioned—is characterized by the ascriptions of beliefs and desires, as when I say, "John thinks it is late and he wants to take the car to go to school." At this level, intersubjectivity requires the constitution of a cultural world with stable, common

[5] Cf. Husserl, 1999, p. 128, where he talks about lower and "higher levels of intermonadic community."

meanings. For the present dissertation, it is not necessary to give a phenomenological account of the main levels of intersubjectivity. My inquiry concerns solely the earliest kind of intersubjective experience that is instantiated by human beings in their ontogenetic development. It is reported by developmental psychologists that infants perceive the basic intentions, emotions, and perceptual experiences of others. This is clearly a low, basic level of intersubjectivity. My question will be whether the theory of pairing accounts for how this kind of intersubjective experience comes about.

The distinction between lower and higher levels of intersubjectivity corresponds to the distinction between low- and high-level mindreading or mental state attribution in philosophy of mind. Low-level mindreading includes precisely things like "motor intention attribution" and "face-based emotion attribution" (Goldman, 2009, p. 247). These are the kinds of mental state attribution that infants are capable of in the first nine months of development. In contrast, the typical examples of high-level mental state attribution—"decision attribution, desire attribution, belief attribution, and the like" (Goldman, 2009, p. 247)—are not usually ascribed to infants before nine months. Hence, the question I investigate in the third chapter can be phrased as follows: how does early-developmental low-level mental state attribution come about?

It is generally accepted that higher levels of intersubjectivity depend somehow on lower level of intersubjectivity and that high-level mental state attribution depends somehow on low-level mental state attribution. I certainly endorse this idea. However, it is important not to neglect a simple consideration. Just as each level of intersubjectivity is an instance of intersubjectivity, low-level and high-level mental state attribution are kinds of mental state attribution. Each level of intersubjectivity requires positing the other as a

minded being by ascribing some kind of lived experience to her. Each kind of mental state attribution requires that mental states be attributed to others (here we are not considering self-mental state attribution). This remark allows us to start seeing with more confidence that expressions like “basic-level intersubjectivity” or “low-level mental state attribution” can be used to track the same phenomena in early development.

CHAPTER 1

HUSSERL AND THE EPISTEMOLOGICAL NECESSITY OF A STRICT PHENOMENOLOGICAL REDUCTION

Prelude: An Epistemological Problem

There is an epistemological problem concerning one's own belief in the world's existence. It is a problem of ancient vintage, but I choose two influential philosophers of the 20th century to present it. The first is Wittgenstein, with his discussion of non-justifiable propositions; the second is Foucault, who points to the problem in his critique of phenomenology.

In *On Certainty*, Wittgenstein claims that some basic propositions cannot be justified because they are presupposed by all other propositions one can possibly formulate. These propositions are like "hinges" in the sense that any inquiry or justification has to "turn" on them, i.e., has to assume them as valid.[1] If you try to justify them, you have to rely on some proposition that logically presupposes them. So their justification is circular and not a real justification.[2] Wittgenstein (1969) mentions the "existence of the earth" as one of these bedrock beliefs (p. 28). We can generalize this a little and say that the existence of the world understood as a spatiotemporal reality is also a belief that cannot be doubted or justified.

[1] "The questions that we raise and our doubts depend on the fact that some propositions are exempt from doubt, are as it were like hinges on which those turn. That is to say, it belongs to the logic of our scientific investigations that certain things are *in deed* not doubted" (Wittgenstein, 1969, p. 44). Because of statements like this, some scholars have considered Wittgenstein as a kind of foundationalist (Caraway, 2003).

[2] As Wittgenstein (1969) puts it, "at the foundation of well-founded belief lies belief that is not founded" (p. 33).

Wittgenstein's remark concerning the non-justifiability of his having two hands allows us to stress why he thinks that nothing can count as evidence for bedrock beliefs.[3] He says that the reason why he cannot take his visual perception of his hands as evidence of their existence is that the sight of his hands is as certain as the hands' existence. Indeed, when I assert that I see my hands I imply that a bodily being exists with head and eyes to see. These facts are no more certain than my hands' existence. Therefore, visual perception cannot work as evidence of having hands. We can capitalize on this consideration and reflect on the belief in spatiotemporal reality. If I had to provide evidence for the world's existence, it seems that the best available option would have the form "I'm justified in believing that the world exists because I experience it." But my experience, as any cognitive act or mental state, is a psychological fact relative to an embodied being existing in spatiotemporal reality. This embodied being has a material existence just as much as the things around it. Consequently, propositions about experience presuppose the world's existence and cannot work in evidence of it. Hence we can take it to be a roughly Wittgensteinian view that epistemic circularity blocks the possibility of justifying the world's existence.

Foucault (2005) hints at the same kind of circularity when he accuses phenomenology of being "anthropology" or a form of "anthropologism." To be sure, Foucault's accusation combines various elements. One idea is that, although phenomenology claims to identify a priori, necessary laws, it actually captures only contingent, factual circumstances of the knower. This amounts to a denial of the

[3] "My having two hands is, in normal circumstances, as certain as anything that I could produce in evidence for it. That is why I am not in a position to take the sight of my hand as evidence for it" (Wittgenstein, 1969, p. 33).

possibility of what Husserl called "eidetic reduction." A second element is that, despite the phenomenologists' attempt to thematize a non-worldly subjectivity, the real subject of phenomenology is utterly mundane. Willy-nilly, phenomenology is about "man." This second strand of criticism amounts to denying the possibility of what Husserl called "phenomenological reduction," which Foucault (2008) explicitly defines as "transcendental illusion" (p. 107).

It is the second strand of criticism that interests me. Because phenomenology is about man, Foucault claims phenomenology falls prey to vicious circularity. Instead of being a radical philosophy that restores the epistemic foundations of even the most basic beliefs, it dogmatically presupposes the existence of man.[4] For Foucault (2005), the fact that phenomenology refers to bodily experience and "sedimented significations" (p. 350) and the fact that it gives rise to "phenomenological psychologies" (Focault, 2008, p. 107) are signs that its epistemological reflections inevitably rely on something mundane—and therefore presuppose the world's existence.[5]

In short, both Wittgenstein and Foucault point to the insight that it is impossible to justify the belief in the world's existence by resorting to something that presupposes it. This insight raises the following epistemological problem (henceforth I also refer to it simply as "the epistemological problem"): it seems impossible to exhibit a justification

[4] According to Foucault (2005), phenomenology confuses "the circularity of a dogmatism folded over upon itself in order to find a basis for itself within itself with the agility and anxiety of a radically philosophical thought" (p. 372).

[5] The same kind of thinking can be evinced in Lawlor's (2004) endorsement of Foucault's critique of phenomenology. Lawlor (2004) first acknowledges that "to use a mundane being […] to account for the reality of the world […] is circular;" then he equates the "empirical" with the "psychological," i.e. the "mundane," and, finally, suggests that phenomenology is unable to differentiate the "transcendental" and the "empirical" (p. 27). The consequence of such reasoning is that phenomenology grounds the empirical on the transcendental, but, because the transcendental is in its turn empirical, the grounding attempted by phenomenology is circular.

for the world's existence because anything that can be employed to this purpose relies on the very thing it is supposed to ground epistemically. In different ways, both Wittgenstein and Foucault respond by maintaining that the problem is insolvable and that in no sense philosophy should try to seek a justification for the world's existence.

In this paper, I contend that Husserl's response to the epistemological problem is different from Wittgenstein's and Foucault's, and is worth considering. The paper is divided into five sections. The first section is exegetical: I show that one of Husserl's motivations for a strict phenomenological reduction is precisely the epistemological problem just delineated. The second section has a more theoretical character: I propose an argument to support the plausibility of Husserl's way of approaching the problem. Then, in the third section, I sketch Husserl's solution, which consists in the realization of systematic analyses from within a new kind of philosophical practice. In the second to last section, I neutralize a common kind of objection. Lastly, in the fifth section, I suggest that the rigor of Husserl's epistemological project goes together with an embodied and socially embedded view of the subject on the ontological level.

By identifying a specific motivation for the phenomenological reduction, I do not try to exhaust this multifaceted topic; rather my interpretation is complementary to readings that legitimately emphasize other aspects of the Husserlian texts. Hence, I declare in advance that my exegetical considerations are intentionally selective, although they seek to capture an essential contribution of Husserl's philosophy. For example, in the first section, I come across a markedly epistemological definition of the "transcendental problem" (Husserl, 1997, p. 168). However, the "transcendental" in Husserl has also a wider meaning, as it had for the Neo-Kantians of his time (Staiti,

2014). According to a comprehensive formulation, the transcendental problem is "the relationship between the knower and the known" (Nenon, 2008, p. 434), and one can easily see how this formulation leaves space for an ontological investigation of both the knower and the known. However, in this paper, I focus on the epistemological delimitation of the transcendental task, as it emerges in certain Husserlian texts.

The reader should be cautioned that the following analysis requires some patience. Examining the Husserlian solution to the epistemological problem requires specifying a number of notions like "phenomenological reduction," "purity," "natural attitude," "world," "original presence," "apodicticity," and, most important of all, "immanence" and "transcendence." All these notions cannot be clarified at once; thus, they must be laid down as the discussion progresses. All pieces will be in place, however, before we consider Husserl's way to ground the belief in the world's existence (section 3).

1. The Epistemological Motivation of the Reduction

The claim that the problem of epistemic circularity relative to the world's existence motivates the transcendental-phenomenological reduction has been already defended by Dieter Lohmar (2002). Here is how Lohmar summarizes his view:

> If we try to find a justification for this universal claim of 'reality' [of the world] we have to start on an experiential ground that does not use this presupposition—neither implicitly nor explicitly—otherwise we use a circular argument. This is the simple motive for the performance of the transcendental reduction. (Lohmar 2012, p. 283)

Lohmar (2002) supports his view concerning the transcendental reduction by discussing six different contexts in which Husserl employs the method of "reduction." He shows that in each of these contexts the legitimacy of a specific claim is under investigation and the same strategy is brought into play: the validity of the claim is suspended in order to identify evidence that does not presuppose it. With the exception of one particular context, I do not revisit Lohmar's accurate considerations. Because Lohmar did not engage in a discussion of Husserl's texts in order to back up his interpretation of the transcendental reduction, I provide textual evidence to this end. I chiefly refer to Husserl's late texts in which he, looking back at his work of many years, presents his own transcendental phenomenology. However, I also show how the epistemological motivation enlightens the first published elaboration of the phenomenological reduction in *Ideas I*.

In the lecture entitled "Phenomenology and Anthropology" (1931), rejecting any characterization of his transcendental phenomenology as being about the "human being," Husserl indicates the ideal of radical self-responsibility as the context from which to begin. In this setting, self-responsibility means the capacity to account for one's own beliefs, i.e., to exhibit the evidence (or non-evidence) that one possesses or may possess for them. For Husserl, the philosopher is a person who tirelessly asks for the epistemic ground of accepted beliefs, defying all dogmatic dicta, including those that come from science or philosophy. This is an ideal, because, although concrete philosophical work realizes steps in its direction, it is always far from being fulfilled in its entirety.

If, in line with this ideal, any belief must be questioned with regard to its evidential grounds, this questioning applies also to the belief in the world's existence,

which is so central in the architecture of our knowledge. Indeed, all our practical life is pervaded by the certainty of the world's existence, and ordinary or scientific knowledge relies on it. Evidently, this certainty remains unshaken even when false assumptions about particular objects are unveiled. Yet, moved by the ideal of self-responsibility, Husserl (1997) raises the question about its epistemic legitimacy: "What status does the evidence for this certitude have?" (p. 490). Note that when one raises this question, he or she should be open to the idea that no justification is available. On the other hand, one should not take non-justifiability as a *dictum*; rather one should investigate whether a justification may indeed be exhibited. If epistemological investigation will give a negative result, then the world's non-justifiability will be a philosophical acquisition, not a dictum.

Husserl is determined to pursue this investigation, which requires one to examine whether there is an epistemic ground that does not presuppose the world's existence. That is: it requires us to perform what Husserl's called "epoché," a putting out of action the belief in the world's existence as basis for philosophical theorizing.

> Once I put in question the certitude about being that operates in my experience of the world, this certitude can no longer serve as the basis for forming judgments. *Thereby* [*damit*] *what is demanded of us*—or of me the meditating and philosophizing ego—is a universal epoché regarding the being of the world. (Husserl, 1997, pp. 490-491; my emphasis)

In other words, the nature of the problem imposes a demand to seek an evidential ground that remains available when we deprive ourselves of the possibility of relying on world's existence. "What then remains? […] Am I not standing *face to face with nothing*?"

Initially we do not know whether such ground exists, but we know that it is the only kind of ground that can possibly function as evidence.

Indeed, in Husserl's entry on Phenomenology submitted to the *Encyclopedia Britannica* (1929), the necessity of seeking such a ground is clarified as a "basic requirement of any rational method" (Husserl, 1997, p. 171). The justification of something that is "in question" necessitates relying on something that is "not questioned." If the evidential ground presupposes what is questioned, then a vicious circle occurs: no real evidence is provided, but merely the non-justified affirmation of what was questioned at the level that was supposed to be the ground. For Husserl, in the case of the world's existence, a ground sheltered from vicious circularity exists and is attainable through a method called "transcendental-phenomenological reduction."

Husserl's idea is that we can find the epistemic ground for the belief in the world in the domain of consciousness if we consider consciousness without assuming the world's existence. For this reason, Husserl (1997) presents the reduction as a "purification" of consciousness from a usual, natural layer of meaning that it has for us (p. 172). Before I explain, allow me to first note that Husserl uses the terms "consciousness," "subjectivity," "mental life," "lived experience," "Ego," or "I," interchangeably.

Unless we adopt a very peculiar philosophical standpoint, we understand consciousness as a feature of a mundane being. For example, it belongs to a human being or some other animal. In contrast to this natural apprehension, the transcendental-phenomenological reduction gives us consciousness in its "transcendental purity:" it is no longer considered, as we otherwise always do, as an event of the world (Husserl, 1999, p.

21, p. 35; Husserl, 1982, p. 135).[6] Through the transcendental-phenomenological reduction, phenomenology can investigate subjectivity without presupposing the world's existence as basis for its own theorizing. As Husserl (1999) puts it, phenomenology becomes "a science that is, so to speak, absolutely subjective, whose thematic object exists whether or not the world exists" (p. 30).[7]

Phenomenology as an "absolutely subjective" discipline investigates nothing other than consciousness, and investigates consciousness independently of the existence of anything other than consciousness. Husserl expresses this idea through a particular modulation of the immanence-transcendence opposition that defines the field of phenomenology (cf. Husserl, 2003, p. 80). The clarification of immanence and transcendence is perhaps the aspect of phenomenology that produces the most unexpected results. Below, we shall see how extensive the immanence of consciousness is, in that it includes a plurality of subjectivities and also the world as "mere transcendental 'phenomenon'" (Husserl, 1970, p. 174). At the same time, we shall see how important it is for Husserl to have at his disposal a methodological procedure that allows one to suspend the validity of all that transcends consciousness. For now, I simply

[6] "Die Phänomenologische Reinheit (Hua III/1, 198, 2007, 2017) bedeutet einmal die Fernhaltung aller das dem Bewusstsein Gegebene transzendierenden Deutungen (z. B. realen oder psych. Apperzeptionen) und wird durch die phänomenologische Epoché oder Reduktion als Absehen all dieser Deutungen erreicht" (Helmuth, 2004, p. 460).

[7] In 1929, Husserl rewrites the following passage: "by virtue of the phenomenological putting out of action our existential acceptance of the Objective world as existing, this sphere of "immanental" being does indeed lose the sense of being a real stratum in the reality belonging to the world and human being (or beast), which is a reality already presupposing the world. It loses the sense of being human conscious life, as can be seized upon progressively by anyone in purely "internal" experience. But it is not simply lost; rather, when we maintain that attitude of epoche, it receives the sense of an absolute sphere of being, an absolutely self-sufficient sphere which is, in itself, what it is—apart from any question concerning the being or non-being of the world and its human beings, while we refrain from taking any position regarding that matter, thus receiving the sense of *something already existing beforehand in itself and for itself, no matter how the question of the being of the world—which can be rightly asked and answered only in this sphere—may be answered on the basis of good or bad reasons*" (Husserl, 1982, p. 66; my emphasis).

note that, despite his pursuit of this method, and his transcendental idealism—which will be discussed later—Husserl always maintained a robust notion of transcendence. He equated this notion to the general idea of "being-in-itself," including not just the factual physical world but also idealities of various kinds (e.g. mathematical), "transcendent essences" (Husserl, 1982, p. 137). Something in itself "is how it is, whether or not I, or whoever, become by chance aware of it or not" (Husserl, 1997, p. 169).[8] Husserl's transcendental idealism is compatible with the idea that the physical universe existed for billions of years without the existence of any consciousness. The world in which we believe is capable of existing when it is not experienced.

It is precisely the existence of the transcendent world that cannot be taken as valid in transcendental investigation as Husserl conceives of it.

> To the essential sense of the transcendental problem belongs its all-inclusiveness, in which it places in question the world and all the sciences investigating it (Husserl, 1997, p. 168).

For Husserl, when we look at consciousness without presupposing the world's existence, we notice that our subjectivity experiences and posits (i.e., believes in) the world. We can then appreciate his relative straightforward formulation of "the transcendental problem:"

> How it [consciousness], so to say, manages in its immanence that something which manifests itself can present itself as something existing in itself, and not only as something meant but as something authenticated [*Ausweisbares*] in concordant experience. (Husserl, 1997, p. 169)

In this formulation, the reference to consciousness "in its immanence" implies that

[8] Transcendent physical things are things "which exist in themselves, whether or not they are perceived" (Husserl, 1982, p. 110).

consciousness is considered without presupposing the world's existence. The mentioning of "something existing in itself" indicates that consciousness comes to believe in something as transcendent. The addition about "authentication" refers to the idea that the transcendent being is posited in a justified, epistemically legitimate manner. Given the philosophical interest in fundamental belief, the transcendent being is first and foremost the world we believe in. Thus, the task is to show how consciousness in its immanence comes to posit the transcendent world in a justified manner. In the Encyclopedia Britannica article, *Husserl defines the transcendental problem as equivalent to the epistemological problem of the world's existence*: to exhibit how the belief in its existence is justified without presupposing it.[9]

Needless to say, this conception of the transcendental problem is quite original. In *Crisis*, Husserl emphasizes that one of the main differences between his transcendental project and Kant's is that the latter presupposed the world as existing (Husserl, 1970, p. 103).[10] Indeed, Kant's transcendental philosophy is about the necessary conditions of knowledge, but the knowledge instantiating these conditions may still be understood as something that occurs to mundane human beings. In an article discussing the relationships between Kant's and Husserl's notions of the transcendental, Nenon (2008)

[9] The intention to seek a justification for the world's existence puts us at a radical level of self-responsibility for one's own beliefs, which for Husserl is fit to be called "transcendental." But this level is not ultimate. That one can problematize phenomenological data shows that there is a further level of transcendental inquiry (cf. Husserl, 1999, p. 29; 1959, pp. 70-71, p. 164). However, at least in a first stage, the issue of whether transcendental phenomenology successfully provides the evidential ground for the world-belief does not require the elucidation of the precise epistemological status of phenomenological propositions (just as we accept justifications of ordinary truths without demanding transcendental examination of the evidence provided for them).

[10] Cf. also Husserl, 1982, p. 142: "the transcendental deduction in the first edition of the *Kritik der reinen Vernunft* was actually operating inside the realm of phenomenology, but Kant misinterpreted that realm as psychological and therefore he himself abandoned it."

observes that both authors sharply distinguish the transcendental from the transcendent, but while Kant understands the distinction primarily in ontological terms (suprasensible vs. features of knowledge), Husserl's perspective is markedly epistemological.[11] For Husserl, the transcendent is what goes beyond that which is "directly given to consciousness" (Nenon, 2008, p. 434). The domain of "the directly given to consciousness" coincides with what a subject sees of itself after accomplishing the phenomenological reduction. Thus, Nenon (2008) concludes that "transcendental purity" is simply the character of a philosophical reflection that, under the phenomenological reduction, investigates consciousness without taking a stance on whether its transcendent positings—notably the positing of the world's existence—are veridical (p. 438).

The Husserlian notion of the transcendental can be clarified though the contrast between transcendental phenomenology and "pure phenomenological psychology" (Husserl, 1997, p. 165). The latter discipline is made possible by a specific method called "psychological-phenomenological reduction" (Husserl, 1997, p. 173). This method consists in putting out of action every "objective positing" accomplished in conscious life while still considering consciousness to be a feature of an embodied being existing in the world.[12] By so doing, the psychological reduction delimits the field of conscious experience in a rigorous way; it establishes "the self-contained field of the purely mental" (Husserl, 1997, p. 173). According to Husserl, pure phenomenological psychology is able to deal with all problems of constitution from the "presently existing objects of the most

[11] For passages where the transcendental is defined in opposition/correlation to the transcendent see Husserl, 1999, p. 26 and 1997, p. 169.

[12] "Andererseits ist es klar, dass ich reine Psychologie nicht anders ins Werk setzen kann, als indem ich zunächst bei mir hinsichtlich aller transzendenten Geltungen Epoché übe" (Husserl, 2012, p. 354).

varied levels, up even to the one Objective world" (Husserl, 1989, p. 426). In other words, pure phenomenological psychology can describe how the psyche forms its objects of experience and comes to believe in them in ways that are epistemically valid. It thus deserves the honorary title of "constitutive phenomenology of the natural attitude."

Crowell (2001) reports that in reading how Husserl was assigning these kinds of tasks to pure psychology, Heidegger noted: "transcendental questions!" (p. 171). It is understandable why Heidegger would have perceived these questions as transcendental, given their focus on object formation and justification (i.e., "object constitution"). Nonetheless, for Husserl these questions are not yet transcendental because they concern subjectivity understood as a feature of a mundane being. That is, since psychology considers consciousness as belonging to a worldly being, it cannot address the problem of the justification of the world belief, which alone characterizes the transcendental level of analysis.

The distinction between transcendental consciousness and psychological consciousness may be perceived as "a mere nuance," but for Husserl the success of phenomenology—and of philosophy itself(!)—depends on this "nuance" (Husserl, 1989, p. 414). In Husserl's view, awakened by the Cartesian impetus, the great authors of the modern tradition (e.g., Locke, Berkeley, Hume, and Leibniz) were already on the track of the transcendental questions addressed by phenomenology, yet they couldn't adequately treat them because they lacked the distinction between a consideration of subjectivity that presupposes the world (the psychological) and one that does not (the transcendental). Being unable to differentiate these two levels of analysis, they inevitably fell into a "transcendental circle" (Husserl, 1997, p. 171). This circle is the absurdity of seeking to

ground the belief in the world by means of a psychological knowledge (cf. Husserl, 1989, p. 421).[13]

In the *Erste Philosophie* lecture-course (1923/24), Husserl had already made it clear that the only way to avoid the "epistemological circle" related to world knowledge is to distinguish two meanings of the word "I," and consequently of the expressions "my mental life," "experience of myself," and "knowledge of myself" (Husserl, 1959, p. 71). In that lecture-course, Husserl was maintaining that the philosophical evaluation of world knowledge could have a higher level of evidence than the knowledge under epistemological scrutiny. But how can this be possible if the object of philosophical evaluation is a psychological item, an event concerning a human being? Philosophical knowledge would presuppose knowledge of the world and so would be affected by the epistemological deficiencies of the latter. The only way to shelter philosophical analysis from such inconvenience is to identify a different perspective on mental life that does not presuppose world knowledge. Only if subjectivity is understood as "transcendental" as opposed to "psychological" or "human," can Husserl's critique of knowledge consistently aspire to a special level of evidence (Husserl, 1959, pp. 71-74).[14]

A look at the *Cartesian Meditations* (1929) allows us to recast the motivation for the reduction (and its novel way of considering subjectivity) from a slightly different perspective. In this text, Husserl evokes the Cartesian ideal according to which the

[13]In previous drafts of the Encyclopedia Britannica article, Husserl had used the expression "epistemological circle" (Crowell, 2001, p. 171).

[14] "Sollte Erkenntnistheorie als voraussetzungslose moglich, ja als das notwendig sein, voraussetzungslos hinsichtlich jeder Erkenntnisgeltung, also auch der der allgemeinen Erfahrung, so muss doch ein Weg von der natiirlichen Einstellung, der naiv Welt voraussetzenden, hinleiten zur erkenntnistheoretischen (transzendentalen)" (Husserl, 1977, p. LVI).

philosopher—moved by personal interest—molds her own knowledge as a system where no piece is taken for granted or without reason. It is the ideal of grounding one's knowledge, which inevitably poses the question of where to start. If the foundation is affected by epistemological deficiencies and unclearness, these deficiencies and unclearness will be transferred to what is founded on the foundation. The beginning must be independent of unexamined presuppositions and must possess a satisfactory level of evidence. For reasons I discuss in the next section, Husserl considers the world's existence incapable of being used "for the purposes of a radical grounding" (Husserl, 1999, p. 17). Husserl claims that it follows from this consideration that we must find a way of theorizing that does not rely on the acceptance of the world's existence (cf. pp. 17-18). Indeed, the world's existence has moved on the side of the things that have to be grounded and this task cannot be carried out if the world's existence is simply presupposed. A beginning of the kind demanded by the Cartesian ideal is achieved only if conscious experience is examined in its "purity" (p. 35), i.e., if transcendental reflection is differentiated from natural, psychological reflection. The phenomenological reduction would create a "universe of absolute freedom from prejudice" in the sense that what is judged does not rely on unexamined assumptions that cannot be brought to sufficient clarity and evidence within this universe of philosophical reflection.

For our exegetical purposes, it matters only to notice that, in the passage we are referring to, the expression "absolute freedom from prejudice" targets precisely "the universal 'prejudice' of world-experience" that "thoroughly and continuously" pervades ordinary experience (Husserl, 1999, pp. 35-36). Thus, within the Cartesian ideal of grounding knowledge, Husserl's most immediate goal is fundamental world knowledge.

In other words, the "absolute 'unprejudicedness'" of the *Cartesian Meditations* appears to be in the first place the character of a philosophical reflection that suspends the positing of the world's existence in order to rehabilitate it as grounded knowledge. The suspension is what allows avoiding the circularity that would re-instantiate the world's epistemic questionability at the level supposed to provide its justification.

After becoming familiarized with the role played by the epistemological problem of circularity in Husserl's texts around 1930, we can cast a retrospective glance on *Ideas I* maintaining the point of view of the late Husserl. This move will be the occasion to provide more precise definitions and a more complete picture of the domain of transcendental phenomenology.

In his 1931 "Epilogue," Husserl (1989) tells us that *Ideas I* dealt with the line of thought that starting from "the problem of the possibility of objective cognition" necessarily leads to bringing subjectivity to "transcendental purity through phenomenological reduction" (pp. 417-418). He tells us the very nature of the problem imposes that "this [pure] Ego as presupposition of all knowledge of the world cannot itself be nor remain presupposed as a worldly being." We already know that the reason of this impossibility is that, otherwise, the Ego would provide a circular justification; yet we will specify the precise sense in which pure subjectivity is "presupposition of all knowledge of the world" when presenting Husserl's solution to the epistemological problem.

In approaching *Ideas I* from the perspective of the late Husserl, it is important to underline that "the problem of the possibility of objective cognition" entails how cognition comes about as justified. Cognition, i.e. knowledge (*Erkenntnis*), is not just

belief, but justified belief. Thus, an inquiry into its possibility is an inquiry into its justifiability. "That the world exists" is indubitable, but this indubitability is not just a brute fact. The task of transcendental phenomenology is "to clarify the ground of its legitimacy [*Rechtgrund*]" (Husserl, 1989, p. 420). The world's indubitability is a rationally justified cognitive fact. In *Crisis*, when the transcendental impulse is defined as "the motif of inquiring back into the ultimate source of all the formations of knowledge," there is no reason to suppose that Husserl does not understand the source of knowledge as a source of justifiability.

A further indication of the particular epistemological orientation of *Ideas I* is contained in Ingarden's historical account. Ingarden (1975) reports that in the first decade of the 20th century Husserl widened his interests in the direction of epistemology, particularly the problems of outer perception and the real world (pp. 10-11). During the same years, the neo-Friesian philosopher Leonard Nelson attempted to show the impossibility of epistemology by arguing that it is inevitably prey to the *petitio principii* fallacy. According to Ingarden's testimony, Husserl knew about Nelson's ideas. Moreover, around the period of publication of *Ideas I* (from 1912-1917), in his lectures Husserl often emphasized the "nonsense" of an epistemological evaluation of outer perception that presupposes realities known through the mode of cognition under investigation. Given this historical context, it is no surprise that Ingarden (1975) readily recognizes that the phenomenological reduction "removes the danger of *petitio principia"* (p.12).

In *Ideas I*, Husserl delimited the field of investigation of pure phenomenology through a method of progressive reduction*s* (in the plural). Almost twenty years later, he

emphasized the importance of following this procedure "step by step" for a clear comprehension of the phenomenological domain (Husserl, 1989, p. 409). Thus, I briefly survey the various methodological steps and I focus on the terminology introduced to specify them. Even when Husserl warns us of dangers connected to the terminology—because the terms themselves leave open meanings extraneous to the specificity of the investigations—he reasserts the substance of the method (see below).

According to *Ideas I*, the phenomenological reduction circumscribes pure consciousness as object of investigation. However, because they can be used as means to address "the modern epistemological problematic," both the method and the field under inquiry can be called "transcendental." The reduction is made up of phenomenological reductions. From "an epistemological point of view" (specifically: the one that has Descartes as its symptomatic initiator), each of these reductions can be called "transcendental" (Husserl, 1982, p. 66).

With Gurwitsch (1966), we can say that "the" collective reduction consists in excluding "whatever is transcendent to consciousness" (p. 176; cf. Husserl, 1982, p. 135, p. 147). Each reduction is a particular "exclusion" (*Ausschaltung*) and each exclusion is constituted by two correlative operations. On the one hand, a subjective positing of a transcendent object has to be "put out of action." On the other hand, the transcendent object that was was posited has to be "parenthesized," or "bracketed" (Husserl, 1982, p. 60). The positing of X is not endorsed by the phenomenologist and cannot function as presupposition of her theorizing. Correspondingly, X is not one of the objects the phenomenologist judges about and the objects she judges about are what they are whether X exists or not (the existence or non-existence of X does not add any determination to

phenomenological items).[15]

The most fundamental exclusion is the one called "epoché" and may be sufficient to bring to sight the transcendental field, though it does not rigorously delimit it (Husserl, 1982, pp. 60, 131, 138). Because discussing all reductions can be cumbersome and makes it difficult to present transcendental phenomenology in a straightforward manner, Husserl often identifies the epoché with "the" total reduction. To avoid misinterpretation, it is of the utmost importance to understand the epoché in its precise terms; for example, Husserl warns us not to conflate it with the exclusion of "all prejudices" and "metaphysics" required by positivism.

For Husserl (1982), the epoché is definable in a single sentence: "We put out of action the general positing which belongs to the essence of the natural attitude" (p. 61). This general positing is precisely defined in a section of *Ideas* devoted to it. It is the positing of "the one spatiotemporal actuality to which I belong like all other human beings" (Husserl, 1982, p. 57). Husserl designates this spatiotemporal actuality as "the" world. The world is for us "factually existing." Although particular realities may be revealed to be non-existent or different from how they were believed to be, the spatiotemporal world is never an "illusion" or "hallucination." Thus, in correlation to setting the general positing out of action, "the whole natural world" is parenthesized (Husserl, 1982, p. 61). This parenthesized world may also be indicated as "the universe of all objectivities" [*Universum aller Gegenstälichkeiten*] or, simply, "the universe" [*Weltall*] (Husserl, 1959, p. xxv, p. 76).

Bracketing spatiotemporal actuality entails bracketing all realities that have a

[15] See this 1931 statement: "the phenomenologist, in all his transcendental descriptions, does not pass the slightest judgment about the world and about his human Ego as a mundane being" (Husserl, 1989, p. 413).

place in it. These include: all animals and human beings, use objects, works of art, social entities (e.g. groups), actualities such as custom or law, etc. (cf. Husserl, 1982, pp. 131-132). For Husserl, these realities are not less real than the natural world; yet, for their being, they presuppose the existence of the natural world. Thus, a reduction specifically targeting them is not needed because their existence is put out of circuit by the epoché of spatiotemporal actuality. In the language of the late Husserl, this epoché suspends *eo ipso* the validity of the entire "life-world."

The remaining reductions are "secondary," but they are nonetheless significant in that they add the necessary rigor and they help clarify the method of *Ausschaltung* (Husserl, 1982, p. 140). They are two: the exclusion of God and of transcendent essences. God must "remain excluded from the new field of research […] since this shall be a field of pure consciousness" (Husserl, 1982, p. 134). That is: the issue of whether God exists or not in no way affects the judgments of the phenomenologist. Transcendent essences are necessary invariants that are not entirely instantiated in events of consciousness.[16] It is at least compatible with Husserl's views to claim that transcendent essences had being even when, for billions of years, they were not thought of. Phenomenological theorizing does not rely on the positing of such ideal objects and their true ontological status is

[16] The phenomenological reduction will "bracket" material essences such as "physical thing," "color," "spatial shape," "psyche," "person," etc. Yet, for an eidetic science such as pure phenomenology, not all the eidetic can be excluded. All "immanental essences," i.e. those "singularized exclusively in the individual events of a stream of consciousness," and basic formal axioms, which apply necessarily to the individual data of phenomenology, are to be included. This inclusion, however, does not introduce anything transcendent into consciousness. Indeed, since these essences appear instantiated in immanent experiences, it complies with the methodological norm of the pure phenomenological procedure: "*to avail ourselves of nothing but what we can make essentially evident by observing consciousness itself* in its pure immanence" (Husserl, 1982, p. 136). For how an essence is essentially included in the phenomenon of the individual, see the following passage: "an individual object is not merely an individual object, a 'This here,' an object never repeatable; as qualitied ''in itself'' thus and so, it has its own *specific character*, its stock of *essential* predicables which must belong to it" (Husserl, 1982, p. 7).

indifferent to the phenomenologist. What is important is that, after all transcendent beings have being excluded, the phenomenologist is in the condition of investigating—as Husserl (1989) still puts it in 1931—"an infinite, self-enclosed, absolutely autonomous realm of beings: the domain of pure, or transcendental, subjectivity" (p. 413). In other words, through the progressive method of reductions and their inhibition of any "position-taking" concerning the existence of something transcendent, one is left with a sphere of subjective being that can be considered for itself, without reference to something extraneous to it (cf. Husserl, 1959, p. 76).

Let us take a quick look inside this domain. It was already implicit in our discussion of subjective positings as "positings of" that an eminent feature of lived experiences is their intentionality. For Husserl, intentionality entails two components: a subjective side, i.e., the experiencing, or "noesis," and an objective side, the "noema," i.e. the experienced object *as experienced in the experiencing*. For example, my present perception is what it is as perception *of* the table in front of me; the table as presented in the perceiving is an indispensable constituent of my perception. Even at a first glance, the phenomenological field presents itself in the form of "the dual topic, *cogito – cogitatum (qua cogitatum)*" (Husserl, 1999, p. 36). A correct understanding of the noema is crucial to the viability of the phenomenological enterprise; hence, the noema is a subject on which much ink has been poured, not without significant achievements.[17] Here I restrict myself to two remarks.

First, from *Ideas* onward, Husserl makes it clear that the noema is immanent in the sense that it is what it is "*just as it is offered to us when we inquire purely into this*

[17] For an interpretation of the noema with which I agree for the most part see Drummond (1990).

mental process itself [of perceiving, judging, liking, etc.]" (Husserl, 1982, p. 2014). Here, purity is the purity obtained with the phenomenological reduction. As Boehm (1968) explained, the notion of immanence that applies to the noema is the one correlated to the phenomenological reduction: "pure" or "intentional immanence."

Second, the world as correlate of experience is not referred to as noema because in Husserl's analyses the term "noema" came to identify a specific kind of intentional correlate (that of particular experiences such as a perception, a judgment, a recollection, etc.). However, Husserl claims that we do experience the world. It is present in "flesh and blood" in perception, although the experience we have of it is immensely incomplete (cf. Husserl, 1959, pp. 46-47). Precisely, the spatiotemporal world is correlate of a continuous synthesis that runs across all our perceptions and even the corrections of perceptual illusions. Throughout experience, the one world is confirmed as factually existing; our experience is experience *of* the world. In various texts, Husserl's assertions leave no doubt that he thinks that there is a sense in which this correlate of experience can be described under the strictest observation of the phenomenological reduction.[18]

In the *Cartesian Meditations*, Husserl specifies that, from the perspective of the reduction, we do not take the world as existing as natural experience does. Instead, "the world is for us only something that claims being" (Husserl, 1999, p. 18). That is: the world presents itself as transcendent, but we do not endorse the claim that is intrinsic to its mode of presentation. As explained in the "Epilogue," what is posited by the phenomenologist is "the universal phenomenon, 'the world of consciousness purely as such'" and it is posited not with the certainty of natural experience, but with the one

[18] At times, Husserl uses the term "phenomenon" as a term that applies to both particular noemas and the world as immanent unities.

characteristic of phenomenological observation: it is posited "in no different a way than other modes of what I have in consciousness and its 'contents'" (Husserl, 1989, p. 412-413). That the world as "transcendental phenomenon" is "a mere 'component' […] within concrete transcendental subjectivity" is repeated in the *Crisis* (Husserl, 1970, p. 174). Sure, Husserl warns us not to take the expressions "content" and "component" in a natural sense, as if they indicated something spatially contained in something else.[19] Nonetheless, Husserl uses these expressions to stress a decisive point for his philosophical enterprise: the world as indispensable constituent of my intentional experience belongs to the field of pure, intentional immanence.

The latter remark leads us to the reason why Husserl criticized the term "exclusion" that was used in *Ideas* as interchangeable with "reduction." Because the world is a crucial finding in the domain of pure consciousness, talk of the "excluding of the world" from the field of research can be misleading. However, in the same passage where he operates such self-criticism, Husserl notes: "In a certain, well-understood sense, this [that the world is not a phenomenological topic] is correct" (Husserl, 1959, p. 432). In what sense is it correct that the world is not a phenomenological topic? In the sense that the phenomenological reduction has to be accomplished for what it is. "The general thesis [of the world's existence] is inhibited;" correspondingly, the factually existing world is no longer something the phenomenologist can judge about, nor something that can affect the meaning of her judgments. The exclusion concerns the world as factually existing, as transcendent, not the world as immanent to the phenomenological field.

I clarify the distinction between the world as transcendent vs. as immanent in the

[19] Also, the meaning of the term "content" in this context must be sharply distinguished from the meaning it has in other purely phenomenological contexts.

next section. The present section is devoted to establishing Lohmar's claim that the issue of epistemic circularity motivates the reduction. After our retrospective evaluation of *Ideas I*, it can be seen how Lohmar's interpretation achieves a double success. On the one hand, it accounts for why it is necessary to stress that there is a sense in which the world *is* a topic of phenomenological descriptions. Indeed, if the givenness of the world in flesh and blood were not accessible to phenomenological reflection, it would be impossible to exhibit the epistemic ground of the world belief (more on this in the section presenting Husserl's solution to the epistemological problem). On the other hand, the interpretive claim explains why it is equally necessary to recognize that there is also a sense in which the world *is not* a topic of phenomenology. If transcendental phenomenology were about the existing world, it would be unable to exhibit the rational ground for positing it. It would bind itself to a mere reassertion of the world's existence.

One more consideration about the extension of the phenomenological field is needed. The method of progressive reductions practiced in *Ideas I* leads to pure consciousness, i.e., the domain of what is purely subjective. This domain includes not only my own individual consciousness, but also all other streams of consciousness with what is immanent to them. Although it might seem obvious that a phenomenologist should reflect on her own lived experiences, the phenomenological reduction imposes no restriction to one's own subjectivity. Though not developed in *Ideas I*, the inclusion of streams of consciousness other than mine is articulated in other texts (Husserl, 1959; 2006). These texts show that one can maintain the belief in the existence of the other streams of consciousness given in ordinary experience (through "empathy"). The phenomenologist can retain other streams if she does not take them as embodied in

worldly beings, but just as pure egos like herself. Moreover, it is possible to maintain that other streams relate to the same intentional objects I experience. Yet one must be careful not to assume that these intentional objects have any existence other than the one they have in the immanence of the streams that actually experience them. By positing other pure streams of consciousness, nothing beyond pure consciousness is posited.

For example, once I operate the phenomenological reduction, I can still describe the perception that I would naturally ascribe to an embodied person sitting over there. I describe that conscious event as follows: it is a perception *of* this table from a perspective different from mine, from another distance, etc. When I describe this conscious event under phenomenological reduction, there is no need to worry about the issue of what justifies my belief in the existence of that perception. For me, that pure perception is simply something that exists and that I describe. It is immediately evident, however, that in general I cannot be justified in positing other mental lives if I am not justified in positing the bodies in which these mental lives are expressed.

Now, the problem of the justification of other mental lives must necessarily be addressed if the phenomenological reduction is put in service of the transcendental task. Indeed, for Husserl, only if I experience that others experience the same world I perceive, can the world be experienced as more than a mere intentional unity within my immanence. I can experience the world as transcendent only if I experience it as "there-for-everyone," as "intersubjective" (Husserl, 1999, p. 91). Respectively, if I am not justified in believing that others experience the world, I am not justified in believing that this world is more than a "private synthetic formation" of mine. For these reasons, Husserl (1999) asserts, "A *transcendental theory of experiencing someone else* […]

contributes to the founding of a *transcendental theory of the Objective world*" (p. 92). Recall the task of transcendental theory as defined in the *Encyclopedia Britannica* article and the assertion becomes comprehensible: a theory of the experiential processes through which the world belief comes about and is verified necessitates a theory of the experiential processes through which the belief in the others' existence comes about and is verified.

But how can I point to the ground that justifies my belief in the others' existence if this ground already presupposes their existence? If I have to identify the ground that rationally motivates me to posit others—and that has motivated me so, long before any philosophical reflection—I have to refer to a ground whose givenness does not imply the positing of others, yet makes that positing rationally acceptable. Thus, I can no longer rely on the existence of others, not even other transcendental egos.

In this way, we come across one of the Husserlian contexts in which, according to Lohmar, reduction means suspension of a claim in order to show the ground of its validity. What is required when the existence of others is in question is a special "deepening of the transcendental reduction" (Lohmar, 2012, p. 300) that sets out of action the belief in other subjectivities and in any entity whose existence presupposes the existence of other subjectivities. As Lohmar emphasizes, this new methodical operation is an "epoché in the epoché" and institutes a "unique philosophical loneliness." Husserl realized it in the *Cartesian Meditations* as "primordial reduction" and in the *Crisis* as reduction to the arch-ego. In the new domain, one can hope to find not just what at first motivates me to posit others, but also what continuously verifies such positing. The identification of such experiential ground is necessary if one seeks to address the problem

of the world belief. For how Husserl conceives of it, the problem requires not just the epoché of whatever transcends pure consciousness, but also the epoché of what transcends the sphere of *my own* "original experience" (Husserl, 1999, p. 114).

We can then recapitulate the results of this first section aimed at corroborating Lohmar's epistemological interpretation. In "Phenomenology and Anthropology" (1931), Husserl shows how the philosophical ideal of self-accountability leads to raising the question of the evidence for one's own world belief, and that the intention to answer this question "demands of us" the "universal epoché." In the Encyclopedia Britannica article (1929), Husserl clarifies that this method is required by the need to avoid the circularity for which the epistemic ground presupposes what is "in question." The profitable terrain sheltered from such fallacy is subjectivity taken "in its immanence." Accordingly, Husserl formulates the transcendental problem as the task of showing how the world belief may be justified without presupposing that belief.

This peculiar conception of the transcendental is enlightened by the contrast with "phenomenological psychology." Despite the idea that the latter can cope with all "constitutive" problems ("Epilogue," 1931), only transcendental phenomenology can radically address the rationality of the world belief. Indeed, in *First Philosophy* (1923/24), Husserl had maintained that an evaluation of the world belief is consistent only if it escapes the "epistemological circle." And in the *Cartesian Meditations* (1929), the domain needed to ground knowledge is obtained by deactivating the presupposition of the world's existence. In the wake of these texts, a retrospective glance on *Ideas I* (1913) reveals the necessity of a theorizing that, in a sense, is not about the world. Yet, it also reveals that the world must be considered as it presents itself in flesh and blood within the

domain of pure immanence. Otherwise, the epistemic ground that is sought for would be missing. Finally, avoiding all circularities imposes a deepening of the reduction that sets out of action the belief in other subjectivities (*Cartesian Meditations*, 1929, and *Crisis*, 1936). Taken together, this textual evidence supports Lohmar's claim that the epistemological problem of circularity constitutes the "simple motive" for the phenomenological reduction.

2. Are propositions that do not presuppose the world possible?

We shall discuss Husserl's solution to the epistemological problem in section 3. However, from considering Husserl's intention to avoid fallacious circularity, one feature of his solution is clear: it must be able to produce true propositions about subjectivity that do not presuppose the world's existence. Furthermore, we learnt that the method that makes such propositions accessible is the phenomenological reduction. Yet one can convince oneself of the viability of the method only by practicing it habitually and self-consciously. So, for whoever the practicability of the reduction is still in question, it would be helpful to acquire a "shortcut" way to gain the insight that the propositions aimed at by the reduction are possible. Once this insight is acquired, it also becomes clearer how the reduction makes those propositions accessible.

The present section examines a shortcut of this kind. It formulates it under the form of an argument, which concludes that certain propositions about subjectivity do not presuppose the world's existence. The argument is based on a famous, controversial Husserlian thesis known as "the possibility of the world's annihilation." On certain occasions, Husserl avoided referring to this thesis since it could be easily conflated with traditional, problematic ideas. However, Husserl believed his transcendental framework

was able to give a totally new meaning and rigor to old ideas. Hence, Husserl defends the possibility of the world's annihilation in a number of contexts (see, for example, Husserl, 1982, pp. 109-112; Husserl, 1959, pp. 44-75; Husserl, 1999, p. 17; Husserl, 2012, pp. 354-356) and was willing to put it in print even in his old age (see Husserl, 1989, p. 420).[20]

Because the world's annihilation has been widely misunderstood, it is necessary to make a number of preliminary considerations before we approach it. Specifically, we need to specify (1) the nature of the world's indubitability and (2) the notions of transcendence and immanence in the framework of Husserl's transcendental idealism. Subsequently, we will be able to appreciate how the world's annihilation represents a key to comprehend the viability of the reduction. This, in turn, opens the way for considering Husserl's solution to the epistemological problem.

To elucidate the world's indubitability, we invoke Wittgenstein's help. To a certain extent, his remarks about the indubitability of having hands can be applied to world as well:

> What would it be like to doubt *now* whether I have two hands? Why can't I imagine it at all? […] *So far* I have no system at all within which this doubt might exist (Wittgenstein, 1969, p. 33; my emphasis).

Wittgenstein claims that he cannot doubt having two hands, but this claim is qualified by the expressions I italicized. Wittgenstein is saying that it is impossible for him to doubt the existence of his hands given the system of experience that currently regulates his

[20] Here is the passage from the 1931 "Epilogue:" "the continual progression of experience in this form of universal concordance is a mere presumption, even if a legitimately valid one, and that consequently the non-existence of the world ever remains thinkable, notwithstanding the fact that it was previously, and now still is, actually given in concordant experience."

mental life. Nothing of what he has experienced "so far" has ever given him the possibility to take the doubt of having hands seriously. There is no reason to suppose that this system will ever change, but the hands' indubitability is nonetheless bound to it.

Husserl would certainly endorse this reasoning. Indeed, for Husserl (1959, p. 50), it belongs to the essence of doubting X that something "speaks against" X. Thus, Husserl (1997) argues that, "as a matter of fact," (p. 490) it is impossible to doubt the existence of the world. Nothing in our experience speaks against it; instead, everything speaks in its favor, even the unmasking of illusions. In natural experience, an illusion concerning a certain aspect of spatiotemporal actuality can be exposed as such only against the background of how the spatiotemporal world really is (Husserl, 1959, 2008). e.g., "It was not a man in the fog; it was just branches…" The nature of the world's indubitability consists in the lack a system of experience where the world can become dubitable. Yet the question is whether this is the only notion of indubitability that is relevant for epistemological purposes, or, as Husserl (cf. 1959) does, we should rather distinguish different notions of indubitability (p. 50). For the time being, we just note that in the same pages in which Husserl discusses the world's annihilation (e.g. ,Husserl, 1959, pp. 44-75), he asserts in the most unshakable way its indubitability. Whatever the former might be, it must be compatible with the latter. At times, to emphasize the profound level of the world's indubitability, which is more radical than that of particular objects like the hands, Husserl (1959) talks of "relative apodicticity," (pp. 397-398, 400-406) where the qualification of relativity should not, however, be neglected.

In moving to the discussion of the immanence-transcendence couple, we need to consider the notion of "original experience" or "givenness," because the latter notion has

an essential role in clarifying immanence and transcendence. Something is originally given if it is given in the "*most original conceivable*" way in which it can be present to someone (Husserl, 1999, p. 103). Three examples may elucidate the idea. First, perception gives the material object in flesh and blood and this is the most direct way that kind of object can attest its existence to someone, as is shown by a comparison with other modes of presentation (e.g., recollection, expectation, pictorial consciousness, etc.). Second, for a mathematical relation, original givenness is insightful mathematical thought. Third, consciousness is originally given through its pre-reflective self-awareness or through self-reflection. I never originally experience streams of consciousness other than mine; in this case, the most original givenness is the one that those streams have of themselves. In Husserl, the importance of original givenness derives from the circumstance that it is implied by any process of verification. For example, I can be justified in believing in the existence of other subjectivities only if their animate bodies are present to me in flesh and blood. Or I can be justified in believing in the laws of physics only if they regulate the world that is originally present to me in perception.

In the *Cartesian Meditations*, Husserl (1999) presents his way of clarifying the "actuality" or "transcendency" (p. 62) of the world (which applies to particular objects as well). He claims that transcendence is inseparable from transcendental subjectivity and, in particular, from "*infinities of harmoniously combinable experiences*." Husserl's view can be explicated as follows: the transcendent (or real) world is the synthetic unity corresponding to an infinite process of experiential verification. More specifically, the world exists if and only if it is the correlate of an infinite system of actual and possible verifying experiences of a plurality of interconnected subjects. This system includes not

only perceptions that give the world in flesh and blood (i.e. in its original presence) and fulfill the expectations coordinated to experienced bodily movements, but also experiences in which others are consistently presented as dealing with the same world. These statements amount to the core of Husserl's transcendental idealism, which, as already mentioned, can accommodate the idea that the universe existed for billions of years before there was any consciousness. In fact, the world's past existence is in principle correlated to the perceptual experience of sentient beings able to experience the world in those conditions. That the world existed entails that if sentient beings of that kind had existed, they would have perceived it. More to the point, the world's past existence is the correlate of an open, present system of experience and thought in which it can be reasonably postulated. The real world is capable of existing when not experienced, although it is essentially related to a consciousness that has to exist at a certain time.[21]

It is crucial to such a view that the original givenness of a transcendent object is not exhausted by any finite multiplicity of manifestations, no matter how many subjects are involved. If the multiplicity of original manifestations is finite, then there are still other manifestations in which the object's existence can be attested. For example, there are other perspectives from which the object can be perceived. It is this relatively simple consideration that allows us to grasp the contrast with immanent beings.

Any delimited segment of conscious experience is a finite multiplicity of manifestations. For Husserl, consciousness is constituted by pre-reflective self-awareness, which means that all its components possess original phenomenality. The noema is the experienced precisely as it is phenomenally given; the noesis is also

[21] Cf. Husserl, 1982, p. 6: "The world is the sum-total of objects of possible experience and experiential cognition, of objects that, on the basis of actual experiences, are cognizable in correct theoretical thinking."

originally given, as I am pre-reflectively aware of my experiencing; and so forth for all components of consciousness. Therefore, the original givenness of any delimited segment of consciousness is exhausted by the finite multiplicity of manifestations that constitute the segment. Any of the components of the segment (e.g., a perceptual noema) has no original phenomenality other than the one taking place in the segment of experience.

The difference between immanence and transcendence boils down to this: the original givenness that verifies (the existence of) an immanent being is exhausted by a finite multiplicity of manifestations; the one verifying (the existence of) a transcendent being is not. Believing in the world's existence means assuming it is the correlate of an infinite process of verification. Setting the world belief out of action (epoché) means simply that philosophical theorizing can no longer make use of the assumption that the world we experience is the correlate of "harmonious infinities of further possible experience" (Husserl, 1999, p. 62).

Granted these considerations, the possibility of the world's annihilation is finally approachable. If I reflect on my experience, it is clear that I consistently experience the one spatiotemporal actuality we call world. I experience myself being embodied and, through my free movements, I perceive things and others in the context of a spatiotemporal actuality that is always there for me. The reality of the world in the past is confirmed by the reality of the world in the present; I expect the reality of the world in the present to be verified in the future and my expectation is continuously confirmed as my experience progresses. I believe that the world has determinations we do not actually experience and that could be experienced fully only in an infinite system of verification. I assume that future experience will confirm the existence of the spatiotemporal world and

nothing allows me to assume otherwise.[22] Nonetheless, I can still ask whether it is imaginable for my experience to proceed in a way that is radically different from what I now assume. Specifically, is it imaginable that my experience undergoes such a drastic transformation that the world's existence becomes dubitable and, even more, that proves itself to be "mere sham [*bloßer Schein*]" (Husserl, 1959, p. 53)?

Notable epistemological consequences depend on the answer to this question. Thus, no illegitimate restriction of the imagination can be allowed, for how grotesque the possibilities carefully envisaged by imagination might seem—imagination is indeed an indispensable method for phenomenological research (Husserl, 1973e).

In fact, I can imagine that, when I, say, walk out of this room, the course of my experience becomes one where no material things, no other people, no objective spatiotemporality, and no lived body as belonging to it, are experienced. More or less gradually, all my perceptual expectations are disappointed. I come to experience only transitory sensible unities such as "colors" or "sounds," and, together with such sensible unities, a "spatiotemporality" experienced by no one else. These "colors" or "sounds" cannot be posited as transcendent realities because they are too transitory; I experience no lived body with which I move to generate controlled presentations of these unities, nor do I experience someone else who could confirm their reality. Evidently, the "solipsistic" spatiotemporality would be experienced in relation to a "here," but no real lived body would be given in the "here," even if some unities were temporarily experienced as located in it. Such is the experience in which the world is annihilated.

[22] As Merleau-Ponty (2012) says, "in the experience of a perceptual truth, I presume that the concordance experienced up until now would be maintained for a more detailed observation; I put my confidence in the world. To perceive is suddenly to commit to an entire future of experiences in a present that never, strictly speaking, guarantees that future. (p. 13)."

An experience of this kind can be imagined intuitively with as many details as I wish. It can be imagined to be like experiencing a series of abstract art paintings, or, better, as experiencing "figures" similar to those perceived in abstract painting. The background out of which the "figures" appears can no longer be posited as spatiotemporal actuality because there is no motivation to believe it has any existence other than the one it has in my experience. Indeed, all enactive and intersubjective horizons of perceptual experience would not be available after the failure of their fulfillment has become the rule. However, as Husserl (1982) puts it, "crude unity-formations become constituted, transient supports for intuitions which were mere analogues of intuitions of physical things (p. 110)." As Majolino (2010) has argued in a detailed essay on the topic, these experiences are fully intentional, as they are experiences *of* transient unity-formations. On the other hand, the unity-formations are "transcendent" in that they transcend instantaneous impressions or constitute a unity across presentations over time, although they never reach the level of worldly transcendence.[23]

Recall that the world belief entails a determination of the total, infinite course of experience. When I posit that the world exists, I posit that the future course of experience is one where the world is endlessly verified. Conversely, imagining the world's annihilation entails an imaginative determination of the infinity of future experience, but in the opposite direction. Imagine that the experience of the solipsistic spatiotemporality just envisaged has become irrevocably final. That is: imagine that the experience of "unity-formations" devoid of the possibility of positing a transcendent world goes on "*ad*

[23] Cf. Husserl, 1973d, p. 288: "ein bloßes "Gewühl von Empfindungen," ein Durcheinander, das in der prä<empirischen> Zeitfolge so unvernünftig aufeinander folgt, daß keine Dingauffassung sich darin erhalten und durchhalten kann, ein bloßes Empfindungsgewühl, sage ich, ist ja nicht ein absolutes Nichts, es ist nur nichts, was eine dingliche Welt in sich konstituiert."

infinitum" (Husserl, 1989, p. 109). In so doing, we exclude the possibility that the mutation of experience is the result of me going "mad" or the work of an evil scientist operating on my brain. If the transformation of experience had such causes, in principle there would remain the possibility that world experience is restored. As a consequence, the world would remain the correlate of an infinite process of possible verification. By imagining that the annihilation of the world in experience goes on "ad infinitum," we imagine that the world does not correspond to infinities of verifying experiences. We are envisaging the possibility that the world has been the mere correlate of a finite segment of experience, i.e., the consistent experience of the world I had so far. Then the world has no existence other than the one it has in my own experience up to a certain moment and lacks any transcendence. In short, we are envisaging the possibility that, despite the consistent experience had so far, the world does not exist and has never existed.[24]

By employing Husserlian concepts, we can immediately add the following qualification: the possibility of the world's non-existence is a "pure possibility," not a "real possibility." That it is not a real possibility means that nothing motivates the thought that such possibility will be realized. Given my experience, in no way can I expect the world not to exist. That the world's non-existence is a pure possibility means that it is *conceivable* that my current experience is followed by an infinite experiential concatenation where the world is annihilated. It is compatible with the essence of consciousness that a delimited course of word-experience is succeeded by an unlimited

[24] Cf. Husserl, 1982, p. 110: "an annihilation of the world means […] nothing else but that in each stream of mental processes (the full stream — the total stream, taken as endless in both directions, which comprises the mental processes of an Ego), certain ordered concatenations of experience and therefore certain complexes of theorizing reason oriented according to those concatenations of experience, would be excluded."

course of no-world-experience. Paradoxically, while I insightfully see the possibility of the world's non-existence, I remain confident in the world's existence just as usual. What I am doing is simply gaining knowledge of a possibility compatible with the general essence of intentional experience. Indeed, this is what a phenomenologist is supposed to do: distinguish necessary features of experience from what might seem to be necessary, but are not.

The world's annihilation is to be understood in its epistemological consequences in light of the distinction between apodictic and non-apodictic indubitability (cf. Husserl, 1959, p. 50; Husserl, 1999, pp. 14-17). Something indubitable is apodictically indubitable if its original presence *a priori* excludes the possibility of its non-being; otherwise, it is non-apodictically indubitable. Because, in Husserl's transcendental idealism, a priori relations correspond to possible acts of thought, the definition can be reformulated as follows: X is apodictically indubitable if, given the original presence of X, it is in no way conceivable that X does not exist. For Husserl, what is immanently given can be apodictically indubitable. For example, it is apodictic that I perceive this table in front of me, that I experience the world in flesh and blood, and that I believe in the world's existence. These immanent facts cannot be experienced pre-reflectively or in reflection without existing: their original presence coincides with their existence. No matter how radically my experience may change in the future, no matter whether the world is proved to be an illusion, nothing can call those immanent facts into question.

In contrast, the world is indubitable, but, *stricto sensu*, not apodictically indubitable. Its continuous, verified presence in flesh and blood in perceptual experience does not a priori exclude the possibility of its non-being. The world's non-existence

remains conceivable. From the epistemological point of view, the possibility of the world's annihilation amounts to nothing more than this: the world's indubitability is not apodictic. Thus, correctly understood, the world's annihilation thesis should not appear entirely implausible to contemporary philosophical ears. In substance, it is equivalent to two claims around which the debate seems to be open: first, the world has not the highest philosophical evidence we can conceive of philosophically; second, the world's existence cannot be logically deduced from the fact of my world experience.

Once the possibility of the world's non-existence has become graspable in its authentic meaning, the argument for the possibility of propositions that do not presuppose the world's existence is easily understood. It can be true that I perceive this table in front of me even if the world does not exist; it can be true that I believe in the world's existence even if the world does not exist; etc. In general, all propositions about immanent facts are unaffected by the world's existential status. The truth of propositions on the course of my experience so far is indifferent to the truth of propositions concerning the future possibilities of experience (those in which the world's reality is expressed). Once a phenomenologist has become aware that propositions about one's own experience are apodictic, while the world is not, she has discovered propositions that do not presuppose the world's existence.

The phenomenological reduction makes such propositions accessible. Indeed, one can grasp how a proposition about experience is not dependent upon the world's veridicality only if experience has been taken in its pure immanence, i.e. only if the reduction as purification of subjectivity has been accomplished at least implicitly. On the other hand, when it is said that the phenomenologist must self-consciously execute the

reduction, what is meant is that the phenomenologist must be well aware of the point of view from which she is considering subjectivity. Her theorizing does not rely on the world's existence and the propositions she produces do not commit her to take a stance on it. Hence, thanks to the reduction, the phenomenologist can be confident that the propositions with which she exhibits the epistemic ground of her world belief are sheltered from fallacious circularity.

3. The Husserlian Solution to the Epistemological Problem

Husserl (1999) declared he had no intention "to abandon the great Cartesian thought of attempting to find in transcendental subjectivity the deepest grounding of all sciences and even of the being of an Objective world" (p. 27). If the goal to ground knowledge of the real world is the same as in Descartes, Husserl is quick to specify his way to attain the goal is radically different. The present section examines how the **"***new idea of the grounding of knowledge*" applies to world belief, considering that this very belief poses a problem of circularity of which Husserl was very conscious. The first step is to consider how reflection on facts of consciousness may be combined with knowledge of its necessary laws, since the Husserlian solution to the epistemological problem makes use of a combination of this kind.

In a number of passages, Husserl explains that, by itself, the phenomenological reduction does not lead to transcendental phenomenology, but rather to a series of reflections on factual circumstances relative to the transcendental ego (e.g., Husserl, 1982, pp. 64, 134; Husserl, 1999, pp. 69-70; Husserl, 2012, p. 352). As we saw in the previous section, the ego's existence becomes apodictically accessible and also at least some of the ego's "concrete-monadic contents" (Husserl, 1999, p. 69). However,

transcendental phenomenology is achieved only by employing a further method called "eidetic reduction" or "variation." This method aims at identifying "a priori" (i.e., invariant, necessary) laws of types of experience and imposes to weigh conscious facts in the same way as "pure possibilities" instantiating universal features. Husserl (1989) claims that the a priori science of pure consciousness precedes the "factual science of transcendental subjectivity" (p. 410). He suggests that, just as a priori mathematical knowledge has made possible the empirical science of nature, so a significant (scientific) knowledge of transcendental facts becomes available only after its corresponding a priori science has been developed.

From the epistemological point of view, the infinite task of a priori transcendental phenomenology is to identify and describe, in each domain of knowledge, the rational links between experiences and claims to truth. In other words, phenomenology must be practiced as a "noetics," i.e., as a science of justification (cf. Husserl, 1996, pp. 311-332). The basic premise of this science of justification is that truths of different kinds are verified in different kinds of experiential processes. Hence, the task is to determine what kinds of experiences justify what kinds of claims: all this at the level of a priori laws. Yet the ideal of self-responsibility requires more than this. The philosopher has recognized that one of the most fundamental beliefs at the basis of his knowledge is the belief in the world's existence and she wants to examine the extent to which this belief is justified. The world she believes in is a factual world and her belief is a fact of her mental life. But no science of a priori laws can by itself justify factual existence. Therefore, as the science of a priori laws of justification, transcendental phenomenology does not by itself provide an answer to the philosopher's question. The "great problem" is to evaluate the

indubitable belief, “I am certain of being a human being who lives in this world.” This problem requires

> that the ego, beginning with its concrete world-phenomenon, systematically inquire back, and thereby become acquainted with itself, the transcendental ego, *in its concreteness*, in the system of its constitutive levels and its incredibly intricate [patterns of] *validity-founding* (Husserl, 1970, p. 187; my emphasis).

The justification of the belief in the world’s existence entails considering factual experience in light of the elucidation of the universal structures of experience. Husserl gives us a precious indication of how it works in discussing the justification of the empirical sciences. He states that “the phenomenological grounding of the factual sciences” occurs in relation to an “empirical phenomenology” that rests “on the methodical foundation of eidetic phenomenology” (Husserl, 1997, p. 176). To paraphrase: after eidetic phenomenology has elucidated the kinds of experiences that are necessary to justify the propositions of the empirical sciences, it is possible to point to facts of transcendental subjectivity which instantiates the kinds of verification under question. Thus, the empirical sciences and the empirical realities they cognize are transcendentally grounded insofar as we can find in the transcendental domain actual experiences that justify their claims and authenticate their objects.

Mutatis mutandis, the same applies to the world belief. If the phenomenological way of exhibiting its justification had to be put in the form of a slogan, we could say: *experience grounds belief*. Passive syntheses, perceptual presence in flesh and bone, affective and practical life, harmonious intersubjective verification over time (never completed and open to the active engagement of the subject), etc.: all these forms of

experience—brought to light in detail by phenomenological investigation—constitute that "evidence in experience […] that […] is operative in us ourselves, habitually and continuously motivating us" to posit the world as real. When short and long term expectations of various kinds (perceptual, practical, intersubjective, etc.) are continuously fulfilled, the world attests its transcendent existence. The factual experience ascertained by phenomenological reflection is precisely of the kind in which a transcendent world "announces itself" (*sich bekundit*) or "makes its appearance" (*auftritt*) for someone. My experience is not of the kind that would demonstrate the non-existence of the world or its dubitability. Instead, it is of the kind where the world belief is not just unavoidable, but also rationally justified. Because the world (including myself and others as human beings) is constantly present for me, I am justified in believing it exists.

Reflect on the last formulation. Taken in its ordinary sense, the proposition "the world is constantly present for me" does not justify the world's existence; it simply presupposes it. What the statement indicates is a series of psychophysical processes through which the world is experienced by me, the human subject. This is the problem of circularity and here is how it is bypassed. The truth of that proposition can rationally motivate me to believe in the world's existence if the proposition is taken to refer to my pure subjectivity, i.e., to a domain of experientiable being that is authenticated independently of how things stand with respect to the world's existence. This domain is made accessible by the phenomenological reduction and this is why this method is required for a consistent grounding of the world belief. "Transcendental grounding" (Husserl, 1999, p. 27) means to become aware of what in the immanence of my experience makes it rational to posit something that transcends it. Thus, it is not about

gaining a knowledge we did not have before. Quite the opposite, the positing of the world has always been accomplished in an unshakable manner. The point is to acknowledge what sustains it. But the rational legitimacy of this belief appears in its light only if I acquire a new awareness of myself as the subject to whom the world and its own worldly embodiment are manifested and that posits these transcendencies as a consequence of their manifestation.

It is essential to the Husserlian solution that one has access to the world as it is present in actual experience. The world, myself, and others as human beings must be accessible in the fullness of how they presented themselves in my experience so far. In other words, the world has to be available as immanent correlate of experience, as "transcendental phenomenon," otherwise the actual ground that motivates my belief is lacking.[25] The actual ground that allows me to assume that the world is correlated to a system of infinite future verification is the course of experience culminating in the present moment. My current experience, together with its bygone phases of world experience, is immanent being. I have to be able to see clearly the presence of world in my immanence if I want to see clearly what allows me to posit the world in its transcendence.

The Husserlian solution requires that the fundamental assumption of traditional skepticism is unveiled and dismantled. The assumption is that experience can offer only a "picture" of the world, not the world itself. Even if the infinite totality of experience were one in which the world is verified, we could not be confident that the world really exists, because the world as it is in itself, beyond our experience, would be inaccessible. What is

[25] "A property of the transcendental phenomenon 'world' is that of being given in harmonious straightforward experience" (Husserl, 1999, p. 95).

verified in the infinity of experience could be the product of an evil genius or a scientist operating on my brain. But the idea of a world in itself beyond experience is absurd. The only world that can exist is the one that manifests itself in the infinity of experience. A world that does not present itself in verifying experience is precisely a world that does not exist. As Zahavi (2003c) puts it,

> the [traditional] skeptical scenario presupposes the possibility of distinguishing in principle between the world as it is understood by us and the world as it is in itself, but it is exactly this possibility and this distinction that they [Husserl and Heidegger] reject. (p.14)

Yet we should not forget the evidence of the world has an ultimate character of provisionality. The world's existence is rationally justified and indubitable, but not apodictic. The world lacks strict apodicticity precisely because the infinite process of experience is never brought to completion: experience is an open process.

4. Neutralization of a Common Objection

It is time to neutralize a usual kind of objection that runs as follows: the description of experience of the world requires considering phenomena like the body, intersubjectivity, language, history, etc. Without these phenomena, the world would not manifest itself as it does. These are worldly phenomena; consequently, to account for world experience, phenomenology must be committed to the existence of mundane beings. Therefore, the reduction cannot be complete, the subject is always in some sense worldly and the Husserlian solution to the epistemological problem is not sheltered from circularity.

Merleau-Ponty endorses this kind of reasoning in a number of passages (e.g.,1964, p. 94, p. 105, p. 180). He repeatedly denies the possibility of a radical

reduction, which is required for the Husserlian solution of the epistemological problem (e.g., Merleau-Ponty 1964, pp. 92, 106, 63-164; Merleau-Ponty, 2012, pp. 27, 382). Perhaps one of the most revealing passages is in *The Philosopher and His Shadow* when Merleau-Ponty (1964) asserts that the natural attitude "does not go beyond itself" and "the transcendental attitude is still and in spite of everything 'natural'" (p. 164) Recall that for Husserl the natural attitude is characterized by the belief in the world as its fundamental positing. Thus, when the French philosopher denies the possibility of overcoming the natural attitude, he is denying the possibility of putting out of action the world belief. As a consequence, the field investigated by phenomenology has to presuppose the existence of the world and cannot function in the demonstration of its justifiability in the way suggested.[26] One of the phenomena by appealing to which Merleau-Ponty denies the possibility of a complete reduction is the lived body. In the present section, I point to how the general objection can be neutralized by tackling this particular aspect of Merleau-Ponty's discussion of the body. In doing so, the peculiar approach to subjectivity inaugurated by the reduction is illustrated in more details.

The Merleau-Pontian reasoning I refer to is the one for which the perception of a material thing requires the body, whose movements give rise to the regulated appearances of the thing. The body is also the necessary "place *from which*" things are seen. Yet the

[26] It has been argued that Merleau-Ponty did not in fact reject the phenomenological reduction (Heinämaa, 1999; Smith 2005). The basic argument for this interpretation is that perception for Merleau-Ponty is not thetic, thus it is not something to which the reduction would apply. This interpretation has two problems. First, Merleau-Ponty doesn't deny that perception presents us with transcendent beings (cf. 1964; p. 163). It is this character of the given of perceptual experience to which the phenomenological reduction applies. Second, Merleau-Ponty uses the term "thetic" to designate the positings of the scientific attitude (and, in particular, those of the natural scientist). Consequently, if Merleau-Ponty denies the applicability of the reduction outside of what he calls "thetic," then he is denying the application of the reduction to the natural attitude, and this was precisely its most fundamental application for how it was described in *Ideas I*. On this issue, I side with Gurwitsch's (1964) interpretation (cf. p. 171).

body is evidently a worldly reality; despite being "on the side of the subject," it is nonetheless a "thing" (Merleau-Ponty, 1964, p. 166). Therefore, the account of perceptual experience involves a worldly reality given in the natural attitude. This makes impossible an investigation of perceptual experience that strictly observes the phenomenological reduction.

In order to neutralize this argument, one has to understand the sense in which perception requires the body under strict observation of the reduction. We can express it as follows: *the experience of the material thing implies the experience of the body*. However, this proposition can be interpreted in two ways. First, the noematic sense "thing" implies the noematic sense "lived body;" correlatively, the noesis directed to the thing implies noeses directed to the body. For example, since the thing is experienced as "something I can grasp" and includes in its sense "the sides I would see if I moved," perception would refer to previous objectivations of my body as something that can grasp and move. This account is not totally implausible as a description of my ordinary experience, which is based on a complex past experience. In the past, I might well have objectified my body in various ways: by touching or seeing it, by "apperceiving" my kinesthetic sensations as manifesting movements of my lived body, by thinking about myself from the point of view of others, etc. These kinds of acts, or their synthesis, would not lose their validity; thus, they would be able to constitute the implicit reference of a present perception, or elements of what Gurwitsch (1966) called "marginal awareness."

If this were all we had to say about the experience of the body, it would be immediately clear why it posits no threat to the viability of the reduction. As argued above, the noema "lived body" belongs to the (intentional) immanence of consciousness,

and positing it does not implying positing anything transcendent (*a fortiori*, noeses directed to the body pose no particular problem). However, it seems clear that the most original experience of the body is not describable as the objectifying apprehension of bodily sensations (tactile, kinesthetic sensations, warmth, hunger, etc.). For objectification is associated to attention, and we do not want to postulate a kind of reflective attention towards one's own body at the most minimal levels of bodily experience. Overall, Merleau-Ponty had good reasons to be skeptical of the idea of accounting of the experience of the body merely in terms of noesis-noema correlation (cf. 1964, p. 167).

The second way of interpreting the proposition that the experience of the thing requires the experience of the body does not rely on objectifying apprehensions. On the contrary, it points to the wide variety of bodily sensations as contents that are "lived through" (cf. McKenna, 1984). Touching something, moving my limbs, feeling cold or hungry, etc., I experience qualitatively different sensations that occupy or "fill up" a certain "spatiality." In particular, the experience of bodily movements, which Husserl calls "*kinaestheses*," deserves specific attention. Indeed, repeated kinaestheses accomplished instinctively generate a sense of possible and habitual movements, an implicit "I can." This experienced "body schema" would be the system by which kinaestheses may associatively motivate other kinaestheses. To summarize lengthy analyses (Husserl, 1989, 1973a, 1973b), the experience of the material thing requires the experience of a "lived through" mobile spatiality; this constitutes a basic level of the experience of the body upon which higher objectivations are founded. Without such lived

through mobility the object could never be perceived as "something I can grasp and move around."

Analyses Concerning Passive and Active Syntheses (Husserl, 2001) suggests that sensations are always already associatively organized and at least some of the forms that are so constituted are "spatial." As I have just argued, this is especially true for bodily sensations. At this point, one might believe to have found the transcendence that would prevent a consistent performance of the reduction. Bodily sensations entail "spatiality," i.e. "extension." Extension is the property of the *res extensa*, which is transcendent, and cannot belong to the *res cogitans*. Therefore, the phenomenological account of perception runs into transcendence, and, willy-nilly, posits a worldly reality. But, again, such an objection reveals a confusion between traditional ontological categories and the categories defining Husserl's project, which is epistemologically oriented. Husserl's immanence-transcendence opposition has little to do with Descartes' *res cogitans–res extensa* division. Immanence is what does not presuppose the existence of the world and "spatiality" is no trouble at all if it complies with this rule. From the reduction's point of view, the "spatiality" of bodily sensations is an experienced "spatiality;" it has no existence other than the one it has as constituent of the life of consciousness. For this reason, positing it does not entail positing a worldly reality. The same applies to the "the Body-as-here phenomenon" (Husserl, 1989, p. 176), whether the experienced "here" belongs to a neoma or is simply "lived through."

I have provided only some quick hints at the massive descriptions of the experience of the lived body one can find in Husserl and Merleau-Ponty. However, these hints are sufficient to make the point: if one *commits oneself* to carry out the

phenomenological reduction consistently, then one can describe the experience of the body without positing it as a worldly being. From the point of view of transcendental phenomenology, the conditions of perceptual experience are not its unconscious causes. Rather, they are those experiences without which its noematic sense would have never been constituted. In other words, conditions of perception are those experiences to which the meaning of the perceived thing contains a necessary reference. Accordingly, the lived body figures as necessary condition of perception only insofar as it belongs to the field of conscious experience. In no other way can something contribute to the phenomenological constitution of a given noema. Thus, independently of the precise way in which the lived body figures in experience, whether as noematic correlate or as "lived through" spatiality, the body investigated by transcendental phenomenology is an experienced body, a "content" of experience, whose existence is entirely immanent to the field established by the reduction.

How can the neutralization of the objection be extended to intersubjectivity, language, history, etc.? It is true that all those phenomena provide an indispensible contribution to how the world is experienced, but they give this contribution insofar as they make their appearance in the domain of transcendental subjectivity. In particular, each of those phenomena corroborates the positing of a spatiotemporal world correlated to the infinity of experience only insofar as it is immanent in the experiential process actualized so far.[27] Analogously, for each domain (embodiment, intersubjectivity,

[27] Once I posit others, things can appear to be more than mere correlate of my experience. Once I experience language and a historical horizon, I am presented with meanings and objects I could not experience otherwise. Positing others, language, and a historical horizon as transcendent entails motivating infinities of expectations, which imply the verification of spatiotemporal actuality as a core. It is insofar as what is posited as transcendent is correlate of my actual experience (i.e. is immanent) that it can structure the meaning of my experience and motivate expectations to be fulfilled in the future.

language, history, etc.), immanent givenness justifies transcendence. In the last analysis, one has to realize that the manifestation of the world is an extremely complex event (cf. Husserl, 1970, p. 187). In its intricately articulated structure, intentional givens require other intentional givens, or constituents that are lived through. Some intentional givens are produced by an intertwining of practical-evaluative operations; others are marginal and pre-reflective. All conscious components signal a development of consciousness over time that can be investigated "genetically," etc. Yet complexity does not mean transcendence, since all these relations are internal to the field delimited by the phenomenological reduction.

Among the phenomena we mentioned, the issue of embodiment prompts the need to dispel a pernicious misunderstanding. It would be a misunderstanding able to invalidate our epistemological ambitions to think that, because pure subjectivity is not embodied, then it must be disembodied. To this seemingly unavoidable conclusion, one must respond: if embodiment entails that subjectivity is a worldly subjectivity, then pure subjectivity is neither embodied nor disembodied. Let me explain.

Husserl explicitly states that there is no possibility to embed transcendental subjectivity in a lived body: "*keine Möglicheit* […] *meine Subjektivität einem Leib einzulegen*" (1959, p. 74). The reason is simple: everything mundane has been bracketed, so it is not possible to say that subjectivity is based on the lived body, which is a worldly reality. In this sense, transcendental subjectivity cannot be said to be embodied. However, this does not mean that it is disembodied (cf. Husserl, 1959, p. 73). By "disembodied subjectivity" we understand a pure mental being, a "pure soul," which either (a) is not linked to the world because the world does not exist at all, or (b) is linked to the body and

world only contingently (it can exist separately). In the first case, a soul is a being that exists in a metaphysical context in which the world does not exist; in the second, it is a being that is connected to a real world for a certain time, but is capable of further existence without that the world conditions it. In both cases, a disembodied spirit is a being whose relation to the world's existence is essentially determined. *Ergo*, transcendental subjectivity cannot be said to be a soul, because transcendental subjectivity is, by definition, something whose relation to the world is *undetermined*. We have to keep in mind that transcendental subjectivity is nothing other than mental life from the point of view of the reduction: it is mental life taken outside of any consideration of the status of existence of the world.

From transcendental subjectivity one can *a priori* exclude the category of disembodiment just as much as the category of embodiment. Affirming that we are "pure souls" entails taking a stance on the world's existence. By saying that we are disembodied spirits who have been fooled about the existence of the world, we negate this existence. By saying that we have been linked to the world for some time, but we are capable of another existence, we affirm the world's existence. Consequently, the existence of "pure souls" is in principle inaccessible to the transcendental attitude. Positing souls implies a metaphysical context in which the status of the world is determined, something excluded in advance by the reduction.

If the subject of transcendental phenomenology is neither embodied nor disembodied, has the notion of subject become mysterious or unintelligible? Not at all. The transcendental "I" can be defined as the "to whom" of experience, the "dative of manifestation" (Sokolowski, 1978). This characterization becomes fully graspable as one

gains familiarity with phenomenological reflection. However, one should not overthink it: the subject is the dative of manifestation and *nothing else*. As Husserl (1973a) puts it,

> *This* I is no human being, no bodily-psychical object; it is simply just I and nothing else, and its life of consciousness is life of consciousness, an I-represent, I-judge, I-want, etc. and nothing else. It is the subject, in whose experiences all objects, all possible objectivities in general have acquired their sense as objects that exist for it precisely with that sense and as authenticating themselves in its ongoing experiences… (p. 441)[28]

Conclusion: Different Dimensions of Husserl's Philosophy

The epistemological problem of the world belief requires elaborating a new perspective. This is the perspective of the pure subject who interrogates its own beliefs. Only from this perspective the problem has a clear meaning. So runs my interpretation of the Husserlian narrative.

Usually, a philosopher comes to raise the problem under the guidance of the ideal of self-accountability. She wants to examine the ground for her beliefs and she reaches the point of questioning the belief in the existence of spatiotemporal actuality. When a philosopher has earnestly posed the problem for herself, she has already assumed the required perspective. However, if there is no method to maintain the perspective consistently, any attempt at a solution is prey to fallacious circularity and the problem itself becomes senseless. Modern philosophers attempted to indicate the ground for believing in the world's existence by focusing on subjectivity. Yet, insofar as they were

[28] Cf. Husserl, 1989, p. 413: "Within my field of transcendental phenomena, I no longer have theoretical validity as a human Ego; I am no longer a real Object within the world which I accept as existing, but instead I am posited exclusively as subject for this world."

unable to sharply distinguish a transcendental approach from a psychological one, their results were open to a psychological interpretation. Anything I can say about a psychological subject does not help me justify the world's existence; rather, it presupposes it. The possibility of a psychological interpretation is the open door for vicious circularity.

On the other hand, without having a firm method at our disposal, the problem becomes meaningless, as it is in Wittgenstein and Foucault. If in practical and theoretical life I constantly endorse the world belief and there is no sense in which it can be "in question," why should I worry about its justification? The problem becomes a pseudo-problem because I never have the real intention to find a justification to my world belief. Think about when a question of justification is meaningful. I can ask whether I, this embodied being, am justified in believing x or y. Have I applied the correct procedure to claim x or y? The question is meaningful if it makes a difference to what I do or affects the awareness of myself, which puts me in a different disposition. At the very least, it must lead me to the awareness of being justified or non-justified. But if I inquire into whether I have applied the correct procedure to believe in the world, at best I shift from not knowing certain things about the world (e.g., how I make use of my sense organs) to knowing them. I learn nothing about the world's justifiability.

To state the point in an equivalent way: if when I ask whether I am justified in believing in the world's existence, what I mean by "I" is a worldly being (e.g., a human being) and I cannot mean anything other than that, then I am simply asking how things stand in the world for this being that I am. I'm not really seeking a justification for my world belief as I perhaps delude myself to be doing. This is the kind of approach one can

find implicitly outlined in contemporary authors such as Wittgenstein and Foucault. It would be the last word on the matter if there were no specific method to guarantee a different meaning to the question on the justification of the world belief.

The phenomenological reduction, taken as completed by the primordial reduction to my own original experience, claims to be the method to pose the question consistently. It is the method to secure the perspective of the transcendental subject who investigates the epistemological status of its beliefs. With respect to the world belief, the answer sounds: I can rationally endorse my belief because the world presents itself in flesh and blood to me and verifies itself by fulfilling my expectations. It is the transcendental subject who is speaking… and there is nothing enigmatic in emphasizing who the speaker is. What is meant is simply this: if I am considering myself as human being, I am not really seeking to justify my world belief; rather, I am simply investigating how things stand in the world. In contrast, through the reduction, epistemological reflection has come to make a difference for me. When merely living my natural life, I was unaware of my justification for the world's existence (although this justification was constantly functioning). After performing the reduction and ascertaining that experience is of the kind that legitimates me to believe in the world, I have acquired a new kind of knowledge, different from knowledge of the world. I have acquired knowledge of the transcendental domain. Now I endorse my belief with the awareness that it is justified. In this regard, I shifted from non-responsibility to self-responsibility.

The key to the Husserlian solution to the epistemological problem is that the very same synthetic unity we call "world" can be considered in two ways. First, the world can be considered as the correlate of my actual and possible experience. Actual experience

includes my past and my current experience; possible experience includes future experience and the experience I could have had in the past had I engaged different manifestations of the world. Second, the world can be considered as merely the correlate of my actual experience. In the first sense, the world is transcendent; in the second, it is immanent. The ground that justifies my belief in something transcendent must be actual immanence.

Because the Husserlian solution does not take the subject to be a bodily being existing in the world, it may seem contrary to the idea that the subject is embodied. Quite the opposite, it is essential to the solution that propositions about transcendental facts of consciousness must be compatible with the subject's embodiment. Indeed, the solution is characterized by the circumstance that it takes no stance on whether the subject is embodied in order to justify the transcendent existence of one's own body together with the world's existence. For this reason, the considerations of this paper are complementary to all those discussions that highlight the aspects of Husserl's philosophy that emphasize the embodied nature of the subject.[29]

Indeed, there is an ontological dimension of Husserl's philosophy from which we had to draw without having the space to focus on it. I call it "ontological" because it tackles the question concerning the kind of being that we are, together with the kind of relations we entertain with the reality of the world and others. It amounts to Husserl's embodied and intersubjective version of transcendental idealism, which can be

[29] See, for instance, Dodd (1997), Lotz (2007), Melle (2010), Mensch (2003), and Zahavi (1994, 2003a, 2003b). As I have explained, I believe my interpretation is complementary to the emphasis that is put on embodiment by these other interpretations. However, if the some proponents of these other interpretations consider their interpretations to be exhaustive of Husserl's philosophy and downplay the textual evidence provided in this paper, then I will have to admit that there is disagreement between these authors and me.

summarized by two correlated statements of principle. On the one hand, the subject of a world that exists is an embodied subject connected to other existing subjects. On the other hand, the existence of the world entails the existence of a plurality of embodied subjects (Husserl, 2003). The reason why these relations of principle subsist is that the systems of experience verifying embodiment, intersubjectivity, and the spatiotemporal world are essentially interconnected. Hence, the ontological and the epistemological dimensions of Husserl's philosophy are structurally related. In order to recognize that with regard to the topic body-world-others experience does ground belief, one has to dispel the dualistic assumption of traditional skepticism and acknowledge the relationship between transcendent existence and systems of verification. Respectively, the ontology of transcendent beings has to accommodate precisely the systems of verification identified by phenomenology as a priori theory of knowledge.

CHAPTER 2

CAN NEWBORN IMITATION BE EXPLAINED THROUGH ASSOCIATION BY SIMILARITY?

Introduction

"Newborn imitation" is a widely discussed topic both in psychology and philosophy.[1] Starting more than 30 years ago, a considerable number of empirical studies have investigated newborns' abilities to imitate simple gestures. Psychologists have proposed different explanations for the findings, and philosophers have debated on the relevance of the phenomenon in regards to theories of social cognition. The extraordinary intuitive appeal of newborn imitation lies not only in the remarkable sensorimotor capacities it entails, but also in the fact that neonates' imitative acts seem to testify to the presence of a cognitive-psychological bond between self and others at birth. But whether such a bond exists and of what kind are questions far from being settled.

Indeed, the variability and relative scarcity of the empirical reports actually ascertaining imitation have led some to doubt that neonates imitate at all. The equivocality of the findings goes then together with a lack of clarity at the level of explanations. Alternative explanations are not clearly distinguished, and it is rare to find attempts to provide comprehensive categories that might give order to the field of possible explanations. Moreover, because it appears at such an early stage, newborn imitation inevitably connects with renowned issues of nativism and learning. However, these issues are often not the focus of attention; hence the notions of nativism and learning employed in the debate easily end up impoverished. Furthermore, there are the

[1] For two recent reviews of the relevant discussions see Oostenbroek, Slaughter, Nielsen, and Suddendorf (2013) and Lodder, Rotteveel, and van Elk (2014).

difficulties related to the definition of imitation. All this indicates that there is much conceptual work that needs to be done.

In this paper, I advocate an explanatory hypothesis for newborn imitation. I call it the "association by similarity hypothesis," or, more simply, the "similarity hypothesis." This hypothesis preserves a fundamental element of Meltzoff and Moore's (1997) Active Intermodal Matching model (AIM), but, as I argue, it relieves this central element from objectionable aspects of the theoretical framework in which it is inserted. For this reason, the similarity hypothesis can be presented as an alternative to AIM, as it is to other explanatory models. In the panorama of competing explanations, the association by similarity hypothesis seeks to be a balanced synthesis of various theoretical points of view.

In addition, I discuss the significance of newborn imitation for the field of infant social cognition without over- or underestimating it. In this regard, I suggest a connection with contributions about social perception coming from the phenomenological tradition: insights by authors like Husserl and Merleau-Ponty help identify how newborn imitation is relevant to the theory of social cognition.

To begin, in the next section, I briefly present the main findings concerning newborn imitation and I offer a preliminary discussion of the ways in which they are explained.

1. The Findings and Preliminary Discussion

The main findings about neonate imitation can be summarized in the following way: experimenters presented infants, who ranged in age from less than an hour to two months old, with a multiplicity of gestures; the infants responded to the gestures they saw with

the execution of those very same gestures, or, to be more precise, they produced a specific gesture *more* when that gesture was presented than when other gestures or no gestures were presented. A response of this kind was labeled "imitation" and the list of imitated acts included mouth opening, hand movements, head movements, lip and cheek movements, eye blinking, emotional expressions, and two types of tongue protrusion (tongue protrusion at midline and tongue protrusion to the side).[2]

As already mentioned, the findings are not uncontroversial. Well known in the field are the critiques by Anisfeld (1996), who claimed that only tongue-protrusion is reliably matched, and Jones (2009), who argued that tongue-protrusions are arousal responses and look imitative only by accident. However, since the aim of this paper is theoretical, i.e. to propose a theoretical framework where findings can be explained, I shall not deal with the experimental issue of how robust the experimental evidence is. As many psychologists do, I simply assume that the evidence is robust enough, i.e. that newborns matching such a variety of gestures is a fact that must be explained. Nonetheless, I do intend to offer an explanation able to meet the skepticism toward newborn imitation. The model of association by similarity accounts for the relative scarcity and variability of the data; thus, it makes it easier to accept that, within its own limits, the phenomenon is real and in need of explanation.

Jones' (2009) observation that tongue protrusion occurs as a response to various arousing stimuli other than modeled tongue protrusion is valuable and will be accommodated in the association by similarity framework. Yet, strictly speaking, Jones' general explanation of tongue protrusion as arousal response cannot be considered an

[2] For a list of the relevant studies see Meltzoff 2005, p. 71.

explanation of newborn imitation. Rather it's a denial of newborn imitation, since it relies on the view that no gestures other than tongue protrusion are matched by neonates. On the contrary, explanations of the comprehensive phenomenon labeled "newborn imitation" are faced with the "correspondence problem:" how infants translate each observed modeled act into the correspondent specific motor act (e.g. perceived mouth opening into executed mouth opening, rather than lip protrusion).

The spectrum of solutions to the correspondence problem can be divided into nativist and non-nativist positions. However, because terms like "nativism" or "innate" are used in various, sometimes-ambiguous ways, I specify the usage I make of these terms and distinguish it from other usages present in the literature.[3] I define a solution to the correspondence problem as non-nativist if it states that the association between visual inputs and the corresponding motor acts is established by ordinary principles of association such as contiguity, operant conditioning, or similarity.[4] In contrast, a nativist solution denies that such mechanisms play a role and claims instead that each connection between a visual perception and the correspondent motor act is a particular product of evolution: it was either specifically selected for in our evolutionary past, or it was a byproduct of evolutionary processes other than merely the ones that brought the principles of association into operation. For a nativist solution, the connection is "built-in," ready to function automatically when the visual stimulus is presented thanks to a

[3] A symptomatic example of a confused usage of the notion of nativism is Lodder et al.'s (2014) categorization of Shaun Gallagher's position as "nativist enactivism." Although their review is valuable in many other respects, Lodder et al. seem to miss that by "innate" Gallagher merely means "something existing prior to birth" (Gallagher 2005, p. 73). Thus, Lodder et al. talk as if Gallagher's position were opposed to learning, which is evidently not true. Most arguments that Lodder et al. take to support learning and be against "nativist enactivism" can, in reality, be easily appropriated from Gallagher's perspective.

[4] For a brief discussion of the principles of association see below (4.1).

preadapted conformation. The advantage of defining "nativism" in this strict sense will become apparent as I make explicit the differences between the competing hypotheses for newborn imitation.

In the strict sense defined Meltzoff and Moore's (1997) AIM hypothesis is *not* nativist.[5] According to AIM, infants have *learned* to associate configural relations between organs to specific movements through spontaneous prenatal activity ("body babbling"). When a configural relation is visually presented, an "equivalence detector" compares it with the actual configural relation of the organism experienced proprioceptively. If a mismatch is detected, the organism seeks to realize the match by executing the movement that is associated with the organ relation visually presented. When the match is realized and detected, the *recognition* of the equivalence of perceived and executed acts grounds "the apprehension that the other is, in some primitive sense, 'like me'" (Meltzoff & Moore, 1997, p. 185). A key element of this model is that there are "supramodal representations" experienced both in perceived and in executed acts; each supramodal representation links the relevant visual stimulus to the corresponding act. While the 1997 articles identifies organ configural relations as the common element between the visual and the motor, more recent texts (e.g., Meltzoff, 2013) seem to suggest that this mediating role is better fulfilled by the "kinetic signatures" of the acts, i.e. their spatial-dynamic features as movements.

Admittedly, the AIM hypothesis is often presented as involving an "innate mapping" (e.g., Meltzoff, 2005, p. 70). But this merely means that the mapping is ready

[5] To be exact, Meltzoff and Moore (1997) suppose that the first stage of the imitation process, i.e. "organ identification," is "preadapted by evolution" (p. 184). However, even with regard to this first stage, they do not categorically exclude a non-nativist explanation relying on the commonality of "kinetic signatures" in perceived and executed acts.

to function at birth without any need for postnatal development. Thus, we must distinguish this weaker sense of nativism from the strong sense specified above. It is true, however, that because the AIM model does not explicitly connect the mapping of actions with the general functioning of association by similarity, it leaves the door open to thinking that there might still be something specifically innate (i.e., evolutionarily selected) about the association of actions. As I show below, the similarity hypothesis excludes this possibility.

It is important to note that all non-nativist (in the first sense specified) solutions to the correspondence problem for newborn imitation rely on association by similarity (implicitly or explicitly). The other principles of associations (i.e., contiguity or operant conditioning) are not viable because newborns have had no experience to associate the vision of modeled acts to their execution by a regularity of contiguity or by virtue of external reinforcements. AIM implicitly relies on association by similarity because it requires that certain organ relations or kinetic signatures are experienced both in perceived and executed acts. In other words, the acts must be similar for the mapping to occur.

In the next section, I examine the two main nativist explanations that can be provided for newborn imitation. Then, in the following sections, I present the association by similarity hypothesis (section 3) and consider its advantages (section 4); I also discuss the significance of newborn imitation for the theory of social cognition by resorting to phenomenological contributions (section 5).

2. Nativist Explanations

The first nativist hypothesis is that newborn imitative responses are reflexes. This hypothesis can be presented in terms of an automatic perception-action transduction (Meltzoff & Moore, 1997) and there are at least four objections against it. First, reflexes are highly specific, linking narrowly defined stimuli to specific responses, but infants have been shown to imitate a wide range of behaviors. Consequently, the explanation in terms of reflexes would require the cumbersome postulate of a different reflex circuit for each imitative behavior and it is not easy to formulate a serious hypothesis for how evolution could have provided circuits for such reflexes (Gallagher 2005, p. 72). Second, reflexes do not tolerate delay, whereas imitation can occur by the mediation of periods of retention (Meltzoff & Moore, 2005, pp. 71–72). Third, reflexes tend to be exact from the start and do not improve over time, but neonates improve their attempt at imitation over successive efforts (Meltzoff & Moore, 1997, p. 187). Fourth, newborn imitation is not compulsory and presents no stereotypy. By contrast, reflexes are automatic and predictable; if reflexes do not occur, there is a neurological reason for this, but there is nothing wrong with your baby if it does not imitate. Since the last three points show that the reflex hypothesis does not fit important details of the data, this hypothesis can be rejected.

A second nativist model can be considered as a more sophisticated version of automatic, reflexive transduction, and we shall call it the "internal reflex hypothesis." In order to clarify this hypothesis, I'll use the expression "visual image" to refer to the processing of visual inputs relative to color, shape, motion, spatial relations, etc. in abstraction from the integration with other modalities. Analogously, I'll use "motor

image" to refer to the processing of proprioceptive inputs about bodily movements and spatial bodily configurations in abstraction from possible integration with data deriving from other modalities.

In the internal reflex model, visual images do not overlap with motor images, or if they do, i.e., if they have something in common, it is not this commonality that establishes a link between them. To be clear, that there exists a link between a visual image and a motor image means that the former can activate the latter. Now, according to the internal reflex hypothesis, the visual-motor links underlying newborn imitation are not the result of commonalities between visual processes and motor processes. In our evolutionary past, natural selection established links between certain visual processes and certain motor processes, so that, when one of these visual processes occurs, the correspondent motor process occurs too.

The internal reflex hypothesis can be explicated in terms of a particular nativist interpretation of mirror neurons. This interpretation conceives the innateness of mirror neurons in a way that excludes reference to similarity: each sensory-motor linkage is simply a product of evolution (Jones, 2009, p. 2329). Accordingly, mirror neurons are understood as *a kind of covert or internal reflex*. The brain would be evolved in such a way that the visual images of specific actions automatically activate a significant part of the motor images of the corresponding actions. The *internal* activation of corresponding motor processing is automatic, but this does not mean that there must be an overt imitative response. For the newborn, the activation of motor processing would constitute a motivation to act, which leads to imitation only if the motivation is complied with.

Indeed, on many occasions there might be more powerful motivations (affects or interests) that prevent the neonate from imitating overtly.

The internal reflex hypothesis is able to meet the objections raised against the reflex hypothesis. One might postulate that sensory-motor links evolved not so much to subserve imitation, but for a more vital function such as action understanding, making the idea of evolutionary processes leading to these links more plausible (Iacoboni, 2009). Moreover, internal mirror links can code a perceived action in motor terms without immediately actualizing it or actualizing it at all, which fits the variety of the findings. Finally, although the internal reflex is in place, there might be a need for practice for the proper execution of the act. This explains why we observe improvements over successive attempts. We conclude that the internal reflex hypothesis is a competitive alternative.

3. The Association By Similarity Hypothesis

The similarity hypothesis for newborn imitation relies on the idea that association by similarity is a basic, ordinary process of cognition. Hence, in preparation for the presentation of the similarity hypothesis in subsection 3.2, in subsection 3.1 I discuss association by similarity in general terms; I also give examples of the application of the principle in theories of perception and of imitation in older infants. Subsection 3.1 is thus a necessary digression where we have to temporarily leave the topic of newborn imitation.

3.1. The Principle of Similarity and its Function in Perception and Imitation

In general, association is a process having this form: connect mental event X with mental event Y. According to a traditional classification from British associationism, there are

three principles of association (Hume, 2000). These principles are easily recalled by means of everyday examples:

1. Similarity: in conversations, when a friend tells me a particular episode, I am reminded of a similar episode I have experienced.
2. Contiguity in space and time: if you think of your countryside house, you may end up thinking of the church next to it.
3. Cause and effect: I find a pile of dirty dishes in the sink and I think about my sloppy roommates.

Arguably, modern scientific psychology has appropriated these principles. Classical conditioning seems to be the heir of the principle of contiguity (the bell sound is contiguous to the food, so it becomes associated with it), whereas operant conditioning can be seen as an application of cause and effect (behavior is associated with its positive or negative effect). Although it was somewhat obscured by other principles, similarity has also been recognized as a fundamental psychological process (Shepard, 1987) and has been studied in sophisticated ways (Nosofsky, 1992).

Association by similarity has been called the "factotum" of cognition because it plays a central role in a number of psychological phenomena such as stimulus generalization, categorization, recognition, memory retrieval, gestalt organization, analogical and inductive reasoning, problem solving and decision (Larkey & Markman, 2005). Furthermore, considering that practically any organism capable of learning must be able to determine its behavior in the face of a new situation on the basis of the experience of similar situations in the past, it is reasonable to suppose that the principle of

similarity must be functioning from a very early stage of evolution (Shepard, 1987).[6] In general, we can define association by similarity as a fundamental psychological process having the following form: connect mental event X with a mental event Y that is similar to X.[7]

This definition is very abstract and we should bear in mind that it has a number of different applications. In order to exemplify two of its applications, I resort to theories of perception and imitation. Starting with perception, I provide a phenomenological insight that can be found in the work of Edmund Husserl.

Husserl (1999) argued that ordinary perception entails a transfer from previous experience to new *similar* experiences. "Transfer" is the process by which—having experienced an object as provided with certain characteristics (e.g. features A, B, C)—another similar object is experienced as having the same characteristics (A, B, C) even if only part of the characteristics of the original object are actually given (say only A and B). For example, a child grasps for the first time the practical meaning of scissors by using a certain pairs of scissors with a parent. Successively, when the child comes across a new pair of scissors, it sees the new pair at the first glance *as* scissors: even if, in the new situation, only the physical aspect of scissors is actually presented (nobody is using

[6] "Because any object or situation experienced by an individual is unlikely to recur in exactly the same form and context, psychology's first general law should, I suggest, be a law of generalization" (Shepard 1987, p. 1317).

[7] The present paper does not deal with the details of how association by similarity may be cashed out in the brain. Perhaps James provided us with the model of any neural formulation of association by similarity when he hypothesized that the evocation of an object occurs when a stimulus is "due to a brain-process some of whose elements awaken through habit some of the elements of the brain-process of the object which comes to view" (1981, p. 556). As an example of recent neuroscientific modeling of association by similarity, I shall just mention Meyer & Damasio's (2009) theory of convergence-divergence-zones, where a particular "fragment of information" acts as *the similar trait* that causes the association with the other fragments relative to a certain object.

the scissors), the child perceives them as having the practical meaning it has learned on a previous occasion (Husserl, 1999, p. 111).

Despite terminological differences, these sorts of perceptual processes are well known in cognitive science. Take, for example, Barsalou (2008):

> During perception, states of perceptual systems become stored in memory […]. Similar stimuli perceived later trigger these memories, simulating the perceptual states they contain. As these simulations become active, they produce perceptual inferences that go beyond perceived stimuli in useful ways. (p. 624)

Phenomenologists would not talk about "simulations" or "inferences." However, what is important is that it is normally recognized that ordinary perception entails "transfers" from past experience to present experience, and that these transfers are motivated by the similarity between past and present stimuli. According to most phenomenologists, similarity as a principle regulating ordinary perception is tacit and does not usually become a content of awareness.

Moving from perception to imitation, it is instructive to look at how Piaget made use of similarity in his theory of the genesis of imitation through assimilation (note that "assimilation" etymologically refers to "similarity"). A classic example of assimilation is the child who, looking at a zebra, says "that's a horse." The child assimilates the new object to the already possessed "schema" that presents the greatest degree of similarity to what it sees. With respect to action, assimilation can be described as the effort to reproduce oneself. When an infant spontaneously reproduces its own actions, it is assimilating those actions. Initially, imitation is a "continuation of reproductive

assimilation" where someone else provides a stimulus to the infant's assimilating activity (Piaget, 1962, p. 11).

Piaget observed that, from the second month of life, infants could imitate the vocalizations of adults (Piaget, 1962). He hypothesized that the sounds the infant hears recall the sounds the infant spontaneously produces in virtue of the similarity between them; this would be why the infant is stimulated to vocalize when it hears vocalizations. Piaget also observed that, between 3-6 months, infants could imitate hand gestures. He argued that this is possible because the infant can assimilate the adult's hand movements to its own, which it had already experienced visually. In summary, Piaget's analysis of early imitation emphasizes that the infant only imitates actions similar to those it has already accomplished and experienced auditorily or visually.

For Piaget, the kind of assimilation presupposed in imitation is no different from ordinary "perceptive recognition" (Piaget, 1962, p. 17). It is not different from that kind of perception "which enables the child to recognize his parents at a distance in spite of apparent change of dimensions, or to that which allows him to react with a smile to certain strangers who resemble those with whom he is familiar" (p. 16). In other words, it is because visual stimuli are similar to those previously experienced that they assume a specific meaning for the infant.

According to Piaget, only at 8 months infants can imitate facial gestures they cannot see themselves make. Nonetheless, when this occurs, a "transfer through similarity" is in place (Piaget, 1962, p. 43). The modeled gesture is perceived as being of the same kind as the infant's own facial gestures because it presents traits that are similar to those experienced in a tactile-kinesthetic modality on the infant's own face. This

perceptual transfer motivates imitation. Furthermore, Piaget comments on "illuminating mistakes" infants commit in attempting to imitate. For example, infants respond to the opening and closing of the eye with the opening and closing of the mouth (or the hand). These mistakes reveal similarity as the "inner mechanism" of imitation (p. 44). Indeed, the visual model is here assimilated to an *analogous* tactilo-kinesthetic schema, i.e. the movement of opening and closing something.

To come back to our topic, the phenomenon of newborn imitation suggests that Piaget's assumption that facial gestures cannot be imitated before 8 months of age is incorrect. However, Piaget's account of how association by similarity motivates infantile imitation anticipates the model of newborn imitation we are advocating in this paper.

3.2. Newborn imitation as reactivation of motor habits by similarity

The association by similarity hypothesis supposes that actions involved in newborn imitation are actions previously executed by the infant in a habitual and spontaneous fashion. Apart from one exception we will examine shortly, newborn imitation consists in the awakening of specific motor habits already possessed by the newborn. The fact that the actions involved in imitation represent well-established proprioceptive habits is implicit in the results of most studies of newborn imitation. These studies show that the same actions that are counted as imitative responses occur in baseline periods where no stimuli are presented or when stimuli other than the gestures of which they constitute an imitation are presented. Indeed, in studies of newborn imitation, the presentation of a model causes a *mere increase* in the frequency of the execution of the modeled act in comparison with the presentation of no stimuli or other stimuli.

But, newborn imitation has been observed within one hour after birth, so the hypothesis can hold only if the relevant motor habits have developed prenatally. If one could find a genuinely imitative response immediately after birth that has not been preceded by spontaneous execution of the same act before birth, *the association by similarity hypothesis would be falsified*, simply because there would be no correspondent previous proprioceptive experience to which the visual experience of the modeled act can be associated. However, the examination of prenatal behavior reveals that all the actions that newborns imitate after birth have already been executed regularly and spontaneously before birth. For each neonatal imitative response, Table 1 provides at least two studies that prove the existence of the corresponding prenatal motor habit.[8] The notable thing in these studies is that they show how the frequency of the actions in question before birth (in particular in the third trimester of pregnancy) is comparable to their frequency after birth.

Table 1: Correlation Between Imitative Responses and Prenatal Behavior

Imitative response	**Relevant studies of prenatal behavior**
Mouth opening	Roodenburg et al. 1991, D'Elia et al. 2000
Hand movements	Katz et al. 2007, Kurjak et al. 2008
Head movements	Roodenburg et al. 1991, Andonotopo & Kurjak 2006
Lip movements	Hata et al. 2005, Reissland et al. 2011, Reissland et al. 2012
Eye blinking	Kurjak et al. 2004, Yigiter & Kavak 2006
Emotional expressions	Kurjak et al. 2003, Kurjak et al. 2004

[8] Cheek movement does not appear in Table 1 because it starts being imitated only at the end of the second month (Fointaine, 1984). The findings show that cheek movement appears as one of the infant's behaviors before the period it was imitated.

Imitative response	Relevant studies of prenatal behavior
Tongue protrusion	D'Elia et al. 2000, Kuriak et al. 2004

Just as for Meltzoff and Moore's AIM model, it is not sufficient to show that imitated actions have been executed spontaneously before they are imitated. Executed action must share commonalities with actions visually perceived; otherwise, according to non-nativist models, they could not be reactivated. The discussion of similarities between executed and perceived actions is the element that the AIM model and the association by similarity model have in common. I shall add some consideration to those of Meltzoff and Moore (1997) in order to contribute to make this discussion more convincing.

Here are features that some of the relevant gestures present both when perceived and executed: mouth opening implies a common style, a rhythm alternating an expansion/stretching phase and a shrinking/relaxation phase; tongue protrusion presents a "prominent movement through" (respectively, the vision of a differently-colored tongue moving through the lips and the felt effort to expel the tongue can be said to be prominent or salient); eye blinking presents a double movement of closing and opening at a certain line on the face; the closing and the opening coincide with the disappearing and appearing of something significant (respectively, perceived eyes and sight).[9]

In the examples just provided, emphasis is on rhythms and movements since, at a basic level, a human subject is more a moving organism than a passive observer of spatial relations (Gallagher, 2005; Sheets-Johnstone, 2011). They represent what Meltzoff and Moore (1997) called the "kinetic signatures" of the different acts (p. 184). However,

[9] We are justified in supposing that perceived eyes are significant to the newborn because evidence suggests that there is an "early […] innate preference for eye contact" (Csibra 2003, p. 454).

reference to "a certain line on the face" points to the experience of spatial positions. The fetus/newborn has "kinesthetic" or "proprioceptive" experience, using these terms as synonyms and in a broad sense. Kinesthetic or proprioceptive experience includes not only the experience of the kinematics of one's own movements, but also the experience of the habitual configurations that organs assume as a consequence of their movements, e.g., the starting and the final positions in a movement. Besides these features, kinesthetic experience provides a sense of *where* organs move in the body, and so a sense of the relative spatial positions of organs. The tactile mode can also contribute to the experience of the relative positions of organs in the body and of the usual configurations they assume. For example, the fetus can touch its face, mouth, nose and eyes and experience the disposition of these organs **(**Kurjak et al., 2004); such a "tactile image" may be integrated in the experience of spatial positions acquired through kinesthesia.

Visually perceived and proprioceptively experienced head movements imply a similarity of rhythm and "linear quality," the term that Sheets-Johnstone (2011, p. 123) uses to indicate the "linear paths we sense ourselves describing in the process of moving." Moreover, thanks to its "isolated" head movements (Kurjak et al., 2008), the fetus might sense the position of its head relative to its trunk—something that appears then replicated in the visual perception of the model. *Mutatis mutandis* for the other actions involved in newborn imitation, with patterns that are common to proprioceptive and visual experiences.[10]

[10] I emphasize that the mediating similarity may rest on a combination of various features including rhythms, spatial relations, and aspects of saliency. However, in Legerstee (1991) infants do not imitate acts simulated by objects when their kinematics are similar in some measure to those of the simulated human acts. This lack of imitation might be explained in various ways. First, lack of visual elements (e.g. perceived eyes) may diminish the possibility of an association with elements that are contextual to proprioceptive mouth actions (the felt presence of one's eyes). Second, the (innate) preference for human faces might put the infant in an attitude that is different from that assumed toward objects. Third, the

Much of what has been said about the self-experience of the fetus/newborn can be expressed by the notion of body schema. By "body schema" I mean: (1) a pre-reflective and implicit registration of one's habitual and possible actions, and of the habitual and possible positions of one's bodily parts; (2) a disposition to actualize such actions and bodily positions. At present, the work of many philosophers and scientists may be cited to support the idea of a primitive body schema acquisition through spontaneous prenatal motility (e.g. Gallagher, 2005; Meltzoff & Moore, 1997; Sheets-Johnstone, 2011; Zoia et al., 2007).[11]

The presence of a body schema facilitates the explanation of the only exception to the rule that imitation involves established motor habits, i.e. tongue protrusion to the side, which presumably has never been previously executed by the newborn. The newborn has developed a somewhat general disposition to its motor possibilities, viz. to the organs it has moved and can move according to ranges of possibilities. When a new act is visually perceived, it is sufficient that some motor possibilities of the relevant organ are known and the infant will be motivated to activate the organ. This is followed by the correction of the response as facilitated by the infant having already experienced a range of different movements. Specifically, the infant can extrapolate a new movement by commanding an organ to move the way another organ typically moves (see the movement of the head as involved in the process of imitating tongue-protrusion-to-the-side—Meltzoff & Moore

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objects simulating the acts were new and unfamiliar (vs. faces as familiar stimuli); therefore, the objects might have provoked exploration responses. Moreover, if we accommodate observations from Jones (2009) and we assume that tongue protrusion is *also* an arousal response, arousal might partly explain the response to the artificial simulation of mouth opening.

[11] The notion of body schema and the association by similarity hypothesis presuppose that the newborn is able to retain aspects of prenatal experience. This presupposition is supported by various studies (Hepper, 2007; Van Heteren et al., 2000).

1997, p. 182). The infant is motivated to correct its imitative response because this does not initially activate all the motor components that are awakened by the repeated presentation of the model.

To summarize, let us rephrase the similarity hypothesis by detailing the inner functioning of association. Visual processes relative to the presentation of the model overlap with motor processes; these areas of overlap are the areas that track the contents experienced both in visual perception and in proprioception. Thus, the processing of visual information relative to a modeled act includes an area that is habitually associated with motor processing (the overlap area is normally activated in motor experience). Because of this usual association, the overlap area activates other areas with which it is usually linked in motor processing. In this way, a habitual action possibility is reawakened, and, if the infant doesn't have stronger impulses that lead it to behave otherwise, it will adhere to this action possibility, i.e,. it will execute the act that we designate as "imitative."[12]

4. The Advantages of the Association by Similarity Hypothesis

4.1. Advantages with respect to the internal reflex hypothesis

In order to identify the advantage of the similarity hypothesis over the internal reflex model, let us make explicit the evolutionary story behind the latter. Admittedly, I sketch out a somewhat simplistic story, but it is sufficient to differentiate the internal reflex model from the similarity hypothesis.

[12] The model accounts for the possibility that the visual image of a modeled act does not always activate the motor image of the correspondent motor act; this may occur when motor processes are globally deactivated (e.g. unwillingness to move or looming drowsiness) or when there are relatively strong impulses to act otherwise.

Hypothetically there was a time when the offspring of our ancestors were not capable of newborn imitation; nor were they capable of understanding the action of others (at least till an age when they did so by means of some association). Some individuals presented forms of internal reflexes of the kind postulated by the model; these enhanced action understanding and newborn imitation, thereby enhancing social interactions. As a result, the hereditary features of these individuals were selected, and species appeared – but not necessarily just the human species! – where internal reflexes figure as intrinsic features of the offspring's brain. Note that, *unless one ends up bringing into play the principle of similarity to explain how each perceived gesture evokes precisely the corresponding motor gesture (and not others)*, it is necessary to postulate that each visual-motor link has been evolutionarily selected.[13]

Let us stress the point: in the internal reflex hypothesis, each link is considered a product of evolution, rather than being understood as a mere consequence of the fact that visual processes and motor processes share common constituents (similarity). Obviously, also the functioning of similarity came to be through evolution, but is a more ancient and basic operating mode and is not specific to visual-motor connections. The internal reflexes hypothesis is contrary to the idea that between gestures seen and executed there is an ordinary link by similarity, i.e. of the kind that occurs in many other cognitive processes.

[13] It is possible to combine a nativist element with the principle of similarity. According to this hybrid explanation, evolution would provide us with a specific system for connecting, on the whole, the visual to the motor; then, similarity would connect each visual image to the *most similar* motor image, i.e. tongue protrusion to tongue protrusion, mouth opening to mouth opening, hand movements to hand movements, and so on. The problem with a hybrid explanation is that association by similarity can account for all aspects of visual-motor translation without postulating devoted evolutionary processes.

Consequently, the advantage of the association by similarity hypothesis is that it does not require postulating additional evolutionary processes for the explanation for action understanding and newborn imitation. All that is needed to explain newborn imitation and action understanding is the principle of similarity, which is already brought about by evolution for other and more fundamental reasons. Association by similarity is a fundamental fact of cognition that must be functioning very early in evolution, even for organisms devoid of action understanding or imitation. Organisms must be able to connect X to a similar mental event Y: otherwise they could not apply the same behavior to slightly different stimuli and they would be practically unable to learn from previous experience.

Similarity may play a fundamental role in action understanding: a visually perceived movement can be understood as "goal-directed action" (as opposed to "mere movement," i.e., change of location in space) because it presents similar traits to actions first-personally executed. A common trait may be, for example, the kinematics of movement or the presence of objects with which the subject has already acted before (the goal). Along these lines, similarity may help explain how a motor system becomes a mirror system, i.e., how it becomes part of the perceptual process encoding a movement visually perceived. Hence, skepticism toward the innate character of mirror neurons (Heyes, 2010) can be accommodated in the similarity framework. Moreover, this framework accommodates evidence that mirror neurons learn to respond to previously neutral tool-related stimuli (Ferrari, Rozzi, & Fogassi, 2005); a plausible way to explain this evidence is to say that motor processing was activated by the repeated observation of

the realization of a goal with a tool, which was habitually realized by the acting hand (see pp. 221-222).

According to the view I am suggesting, similarity needs to be in place for:

(1) all the phenomena mentioned in 3.1 (generalization, recognition, retrieval, etc.);

(2) imitation (as I suggest in 3.2);

(3) action understanding (as I suggest in this section and as it is consistent with an analysis of action perception findings that I refer to in 5.1).

Therefore, if one accepts that the neural structures of a newborn allow for association by similarity and that, as argued in section 3.2, it is possible to identify common features experienced both in visual perception and in motor execution, then it is superfluous to postulate additional mechanisms to explain newborn imitation and action understanding. Internal reflexes do not do more explanatory work than association by similarity: they simply explain why specific visual images bring about specific motor images. Association by similarity does the same without postulating an additional evolutionary process or processes.

Further, as for emphasizing the wider scope of association by similarity, consider that, even in the newborn, it must be in place for reasons other than visual-motor translation. For example, when a newborn "recognizes" a still face as a face that has produced a specific gesture 24 hours before (Meltzoff and Moore 1997, p. 181), it is coding a visual stimulus F in terms of a past similar visual stimulus F^1.

4.2. Advantages with respect to AIM

In 3.2 I emphasized the extent to which the similarity hypothesis is congruent with Meltzoff and Moore's (1997) AIM. I shall now point out two main advantages that the similarity hypothesis has over AIM.

First, the similarity explanation allows us to bypass the somewhat overestimated problem of the function, or motive, for newborn imitation. AIM is associated with the idea that newborns imitate in order to test the identity of other people (Meltzoff & Moore, 1992; Meltzoff, 2013). This idea seems implausible and too cognitively loaded. Unlike AIM, the similarity model does not induce one to look for a reason for imitation external to the mechanism underlying it. The reason to imitate is, so to speak, intrinsic to the functioning of similarity. According to the similarity framework, something that is available to the newborn for more fundamental functions (e.g., stimulus generalization) takes the role of mediating a new kind of behavior (i.e., imitation) under a very specific environmental condition (the repeated presentation of modeled acts). That is: association by similarity ends up motivating newborn imitative responses even if that is not the aim for which it evolved.

How does this "motivating" work? I submit that the imitative response is "induced" or "suggested" by the presentation of the model. The modeled act awakens a motor habit that can be implemented. *The mere evocation of an action possibility is a motivation, or "enticer," to fulfill it*, when stronger motivations are not conditioning the newborn otherwise. In Piagetian terms, one might say that the child *assimilates* the modeled act to his previous activity, where assimilation is a "fundamental tendency" of the acting organism to practice, to repeat one's activity (Piaget, 1952, p. 42). The

essential point, however, is that—once an action possibility has been recalled—this being-recalled makes that action more prominent in contrast to the range of action possibilities that remain in the background; thus, *other things being equal* (i.e. if stronger, unpredictable impulses do not favor other responses over the imitative response), the infant will be more likely to enact the action possibility that has come to stand out.[14]

Three valuable consequences derive from considering the presentation of the model as merely "suggesting" a motor act through similarity. First, the relative scarcity and variability of the findings on newborn imitation becomes easily intelligible. Compared to the affective states that are constantly conditioning a newborn, association by similarity constitutes a weak motivation. Thus, it may well be that newborns often do not react to modeled acts or react in unpredictable ways. Second, more light is shed on the allegedly sudden decrease in imitation after the second month: if it is true that the second month sanctions the beginning of a more active engagement with the social environment (Rochat & Striano, 1999), then it is clear that the infant will be less disposed to let the "choice" of its behavior be determined by a passive stimulus (as it is in newborn imitation) but will behave more according to a self-determined stance. Third, we can elegantly accommodate Jones' (2009) observations concerning arousal. In the similarity

[14] This view is consistent with Kinsbourne's (2002) enactive account and with the Ideomotor Approach (Prinz 2005). Kinsbourne claims that imitation is uninhibited enactive perception, which "reinforces those movements [of the infant's motor repertoire] that are perceived" (p. 317). If we had to phrase the contribution of this paper in terms of the enactive theory of perception, we could say that association by similarity makes clear why a neonate enactively perceives in a specific way (imitative response) rather than reacting with different motor responses. The Ideomotor Approach is based on an assertion by James: "every representation of a movement awakens in some degree the actual movement which is its object; and awakens it in a maximum degree whenever it is not kept from doing so by an antagonistic representation" (quoted from Prinz, 2005, p. 143). The association by similarity hypothesis for newborn imitation can be considered as a specific application of the Ideomotor Approach; in this particular case, the perception of the model shares features with the "resident effects" that accompany the neonate's own actions (Prinz, 2005, p. 144). It must be remembered that the Ideomotor Approach has a much wider scope and many other applications, which is not the goal of this paper to discuss.

framework, arousal can still function as a reinforcing motivation for the tongue-protrusion response, which would explain a certain predominance of tongue-protrusion in newborn imitation studies.

The second main advantage of the similarity hypothesis is that, unlike AIM, it does not rely on cognitively loaded mechanisms of comparison and recognition. Recall that the central step of the process postulated by AIM is the comparison between visual and proprioceptive information (see Meltzoff & Moore, 1997, p. 186). Just as in any other comparison, two representations are involved in this comparison in order to give a verdict (match or mismatch). We can then identify three structural differences between AIM and the similarity hypothesis:

a. AIM entails that two representations are compared. That is: two representations, i.e., a visual representation and a proprioceptive representation, figure as inputs of a computation that gives an outcome (either match or mismatch). In contrast, in the similarity hypothesis, the only input is the visual representation; the outcome is the activation of the proprioceptive representation. It is a "one-step" process where the visual representation activates the proprioceptive representation that overlaps the most with itself, i.e,. the representation of the corresponding act.[15]

b. In AIM, the comparison occurs with "the current position of the infant's own body" (Meltzoff & Moore, 1997, p. 185). This representation of one's current position has no comparable role in the similarity hypothesis. Rather, in the latter

[15] Indeed, in spontaneous motility, the supramodal elements replicated in the visual representation of the modeled act are connected to a greater extent with elements of the proprioceptive representation of the correspondent act, rather than with elements of the representations of other acts in the newborn's repertoire.

hypothesis, a visual representation overlaps with a retained (i.e. not currently activated) motor representation.

c. AIM culminates in the recognition that perceived and executed acts are equivalent (the result of the comparison is a "match"). On the contrary, the similarity hypothesis simply supposes that the newborn executes a gesture that has been evoked, not that it must recognize the equivalence of its gestures with other gestures. Since there is no comparison, there is no final verdict of a "match."

In order to emphasize the difference with AIM, consider the following statement: "When a human act is shown to a young infant, even a newborn, it may provide a salient recognition experience: 'That seen event is like this felt event'" (Meltzoff, 2007, p. 130). The association by similarity hypothesis strongly denies that newborn imitation entails such recognition. *What is required is just the activation of motor processes by visual processes.* This activation represents the reawakening of an action possibility, and, therefore, a stimulus to act. If the infant adheres to the stimulus, the act that we designate as "imitative" is accomplished. The fact that the representation of the model is similar to (i.e., overlaps with) the corresponding motor representation is what activates this specific motor representation, but this similarity doesn't have to be recognized or perceived.[16]

The problematic consequences of postulating an act of recognition intrinsic to imitation are revealed in the way Meltzoff describes newborn imitation as entailing social cognition (Meltzoff, 2013). If one accepts that newborn imitation implies the recognition that the acts seen in front of oneself are like the acts proprioceptively felt in oneself, it is difficult to suppose that the other is not recognized to be in some sense "like me." Just as

[16] One should never conflate a mechanism or a principle of cognition with what is cognized in cognition (the object of cognition). A mechanism of cognition is not necessarily something that is cognized.

most of us would readily do, Meltzoff considers a recognition that the other is like the self to be a form of social cognition. Indeed, recognition implies that some significant information about the other (and the self) has been processed, namely, that the other is in some sense like me (and I am like the other). This is why newborn imitation is described as entailing social cognition. We can make explicit the line of thinking underlying Meltzoff's view as follows. Newborn imitation entails the recognition that the other is like the self. Recognition that the other is like the self is a form of social cognition. Therefore, newborn imitation entails a form of social cognition, and social cognition starts in the newborn period (Meltzoff, 2013).

Needless to say, there is some widespread healthy skepticism toward the idea that neonates have a sense that others are like them, which seems simply too much for them, and even unnecessary. Thus, an additional problem with Meltzoff's AIM model is that, by postulating a cognitively loaded mechanism of newborn imitation, it postulates a cognitive leaded mechanism of social cognition.

Also other views seem to be unjustified in considering newborn imitation as a form of social cognition, e.g., as a form of "social understanding" (see Lodder, Rotteveel, & van Elk, 2014 for a review) or "communication" (Oostenbroek, Slaughter, Nielsen, & Suddendorf, 2013; Reddy, 2008). What does the newborn "understand" and in what sense does it "communicate"? Certainly, it is not easy to argue that newborn imitation entails understanding others' subjective experiences (in the present stage of research, there is no compelling evidence that infants perceive or comprehend others' subjective states during the first two months of life).[17] Further, even if one admits that newborn imitation is an

[17] For example, evidence of a rudimentary form of gaze following in newborns (Farroni et al., 2004) does not imply this kind of social perception. Instead, it may merely suggest that newborns are driven to look at

affectively charged reciprocal interaction between infant and caregiver, it is not clear in what sense it would count as a form of social cognition on the part of the infant. There are affective reciprocal interactions with regard to which we do not normally claim that the infant accomplishes acts of social cognition (e.g., sucking the mother's breast).

In contrast to the AIM-"like me" model and other views, the association by similarity hypothesis is not committed to the claim that newborn imitation entails a form of social cognition. In the similarity story, the newborn is stimulated by the modeled act to a specific action and it adheres to this stimulus. In doing this, the infant is not required to have understood anything about others or to have communicated with them. This is an advantage of the similarity hypothesis: it can be accepted without having to defend the claim that a form of social cognition (e.g., recognition of likeness, understanding of others' subjective states, communication) occurs in the newborn period.

Obviously, one could try to defend a broad notion of social cognition according to which newborn imitation would count as an instance of social cognition. For example, one could stipulate that any interaction between agents is social cognition. But the point to remember is that the similarity hypothesis does not commit one to this sort of definition; hence, in general, it does not commit one to defend claims about the presence of social cognition in the newborn period.

One could think that AIM proponents can accept the insights of the similarity hypothesis without rejecting the main components of AIM and as a consequence, the similarity hypothesis is not really an alternative. However, what this discussion reveals is that AIM proponents would have to be able to accept the following claims:

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a target by a perceived motion—Brooks & Meltzoff (2014) correctly describe it as "motion following" (p. 172).

1. Newborn imitation is just an ordinary application of the principle of similarity and there is nothing specifically innate about visual-motor action translation.
2. In neonate imitation there is no comparison or recognition, only a reactivation of a motor habit.
3. Newborns do not imitate in order to test other's people identity; rather, the awakening of a motor habit is an intrinsic stimulus to an act that we designate as "imitative."
4. Neonate imitation does not justify the claim that social cognition begins in the newborn period. Specifically, it does not justify the claim that others are recognized to be like the self.

Because these points are substantial, at present it is not clear that AIM proponents would endorse them. Thus, it is safer to present the similarity hypothesis as an alternative to AIM.

5. Association by Similarity and Social Perception

At this point, we must be very careful. If newborn imitation is not a form of social cognition – as the similarity hypothesis would allow us to think – does it mean that there is no connection at all between the two topics, i.e., newborn imitation and social cognition? No, it doesn't. If both newborn imitation and social cognition require association by similarity, then newborn imitation could tell us something about association by similarity that may possibly be significant for the theory of social cognition.

Thus, the question for this final section is: if, in line with the similarity hypothesis, we do not assume that newborn imitation entails a form of social cognition,

can we still claim that newborn imitation is relevant for our theorizing on social cognition? In order to answer this question, I shall capitalize on contributions concerning perception that one can find in the work of phenomenologists like Husserl and Merleau-Ponty. From within the framework constituted by these phenomenological insights, it is possible to identify a way in which newborn imitation can be significant for the theory of social perception; nonetheless, it is not necessary to assume that newborn imitation entails a social-cognitive act.

Subsection 5.1 will be another short detour away from the topic of newborn imitation; in it, I will examine a phenomenological insight already introduced in 3.1 and I will make explicit its consequences for social perception. In 5.2, I will come back to newborn imitation in order to show how it is relevant to social perception.

5.1. Perception and Social Perception

Let us return to the example from Husserl introduced in 3.1: scissors are directly perceived as scissors without having to recall scissors experienced in the past. When I suddenly come across a new pair of scissors, I am immediately aware of the specific functionality of that object (i.e., its practical meaning) without having to recognize that what I see is *like some other scissors* previously experienced. Obviously, the perception of a new pair as having a specific practical meaning occurs in virtue of the similarity between the present pair and pairs experienced in the past; but the crucial insight is that similarity acts as a principle by which we interpret visual stimuli without similarity itself becoming an object of awareness.

To be precise, we must identify an ambiguity in ordinary language. Sometimes, saying “I recognize a new object as being like others” implies that I become actually

aware of the similarity between objects. In this sense, the expression entails recollecting past objects and a comparison with them. Other times, it merely means that I am aware of some physical features and a specific meaning, but that this specific meaning has been experienced in association to other similar objects in the past. According to a phenomenologist like Husserl, only the second sense of the expression captures essential requirements for ordinary perception.

Now, just as I normally ascribe a specific meaning to a new object on the basis of the similarity with past objects without becoming aware of the fact the object is like certain past objects, so I can ascribe subjective experiences to others on the basis of the similarity of their behavior with my own behavior without becoming aware that others are "like me." The following passages from Merleau-Ponty (1964) capture a crucial insight concerning social perception:

> I can perceive, across the visual image of the other, that the other is an organism, that that organism is inhabited by a "psyche," because the visual image of the other is interpreted by the notion I myself have of my own body. (p. 118)[18]

When phenomenologists make such assertions, one must not think that the experience of one's own body is considered to be the term of a comparison. Rather, as Zahavi (2014) correctly points out (p. 133), the experience of one's own bodily self-constitutes the "reservoir of meaning" by which a subject can interpret others as inhabited by subjective experiences. I experience my bodily behaviors as impregnated with subjective experiences; thus, when I encounter the similar behaviors of others, I apprehend them in terms of what is associated with my own behaviors. In short, phenomenological insights

[18] See also Merleau-Ponty 2010, pp. 28, 32; Merleau-Ponty, 2012, p. 370; De Preester. 2008.

suggest that it is possible to perceive others' subjective experiences without becoming aware that others are like me. Similarity with my own behavior plays a more fundamental, tacit role.[19]

As I have argued elsewhere (cf. third chapter), this view of social perception may apply to infant social cognition. Indeed, there is much evidence that infants' experience of their own behavior is what allows them to perceive aspects of the subjectivity of others such as "intending a goal" or "seeing something" (Brooks & Meltzoff, 2002; Cannon, Woodward, Gredebäck, von Hofsten, & Turek, 2011; Falck-Ytter, Gredeback, & von Hofsten, 2006; Hauf, Aschersleben, & Prinz, 2007; Meltzoff, 2005; Sommerville & Woodward, 2005; Sommerville, Woodward, & Needham, 2005; Sommerville, Hildebrand, & Crane, 2008; Woodward, 1998; 1999). This evidence differs from findings on newborn imitation for two reasons. First, this evidence strongly suggests the presence of a sensitivity to the "goal-relatedness" (e.g., Sommerville et al., 2005) or "object-relatedness" (e.g., Brooks & Meltzoff, 2002) of others, which is an indicator of social cognition. In contrast, newborn imitation may occur without the perception of the other as "intending a goal;" what fulfills the function of awakening a motor habit may be the sheer dynamics of the perceived movements (variations of positions in space), which includes the final configurations assumed by the body (for example, in mouth opening: the maximum and the minimal distance between the lips). Second, the evidence I just referred to concerns a stage of development that is successive to the newborn period. For

[19] It is also because similarity operates tacitly that phenomenologists tend to defend accounts of "direct social perception" (De Jaegher, 2009; Gallagher, 2008; Zahavi 2011). In this sense, the perception of other's subjective experiences is direct because it doesn't presuppose that one becomes aware of self-other similarities.

this later stage, we have more convergent evidence that makes it plausible to talk about "social" cognition (Reddy, 2008, Rohat & Striano, 1999).

In light of the phenomenological view of social perception presented in this subsection, one can read the evidence on how, after the newborn period, self-experience influences infant social cognition as follows: similarity between the behaviors of self and others is the tacit criterion by means of which the seen behaviors of others are interpreted as animated by subjective states. As we have seen in subsection 3.1, perception entails transfers of features from past experiences to new similar stimuli. When the infant perceives the behaviors of others, it experiences some of the same characteristics of its own behaviors and this generates a transfer of features of subjectivity (e.g., "intending a goal" or "seeing something") that are usually experienced in the self.[20]

5.2. The significance of newborn imitation for social perception

The phenomenology-inspired claim that infants come to experience others as endowed with subjective states on the basis of the similarity between others' behavior and their own requires a detailed analysis of infant-caregiver interaction (cf. third chapter).[21] The problem with showing the plausibility of this claim is that it is not sufficient to identify common traits in the behaviors of the infants and the caregivers (rhythm, kinematics,

[20] Unlike what Meltzoff's "like me" hypothesis seems to suggest in many passages, the phenomenological view does not entail that the infant has to "recognize" the similarity (there is no need for a comparison computation giving a "match" result). Here the point is not that there cannot be a sense of likeness or resonance (which probably occurs at a certain stage). Rather, the point is that this sense of likeness is not essential in order to perceive the other as having subjective states. But, to be fair, a further consideration must be made. Perhaps one could argue that the phenomenological insights simply constitute a more sophisticated version of the "like me" hypothesis. Rather than representing an alternative framework, they would call for a radical reformulation, which would make clear that social perception does not imply becoming aware of the similarities between self and others. Ultimately, I remain neutral with respect to whether the "like me" hypothesis is compatible with phenomenological insights concerning social perception.

[21] To point to the relevant literature, I shall mention Kokkinaki & Kugiumutzakis, 2000; Murray & Trevarthen, 1985; Stern, 1985.

tone, object-relatedness, etc.). It is essential to provide evidence for the idea that these common traits are indeed able to determine the infant's cognitive operations. This evidence doesn't have to be about the social-cognitive act of ascribing subjective states to others; if similarities are shown to be relevant to other behaviors of the infant, it will be plausible to assume that they can become relevant to social cognitive acts too.

Hence the significance of newborn imitation: if the similarity hypothesis is correct, newborn imitation shows that a central prerequisite for perceiving others as animated by subjective states, i.e., the similarity between bodily activities, is already functioning at birth. In other words, newborn imitation shows that infants associate the experience of their own bodily activity to the experience they have of others from very early in development; therefore, it makes it more plausible that *such association may, at a later stage, play a role in the perceptual transfer of subjective states to others* (see 3.1 and 5.1 for the notion of "transfer"). Consider that if the newborn can associate the behavior of others to its own when its motor repertoire is so limited, then it will be able to do it even more as its actions become more complex and start to engage objects and the social environment.

Finally, a usual objection to the claim that infants experience others as endowed with subjective states on the ground of an association by similarity between their behavior and others' behavior is that infants experience themselves proprioceptively and experience others visually, so the two experiences have nothing (or nothing significant) in common. This objection is undermined by the association similarity hypothesis for neonate imitation; in the similarity framework, newborn imitation attests that intermodal

associations by similarity between bodily activities operate even before the subjective states of others begin to be perceived.[22]

Even if newborn imitation does not entail a form of social cognition, it can be relevant to the theory of social cognition. It tells us something about association by similarity, i.e., that it is so basic that it can occur in the newborn period. It is therefore not unreasonable to suppose that association by similarity underlies other cognitive operations of the infant. In particular, association by similarity may underlie the perception of others' subjective states, which occurs after the newborn period.

Conclusion

In the debate on newborn imitation, the association by similarity hypothesis represents an original synthesis of various theoretical points of view. Relying on the assumption that newborns match a variety of behaviors modeled by adults, the similarity hypothesis predicts that this matching response will be variable and often absent, because it has to compete with the fluctuating affective states of the newborn, including arousal (section 4.2). This hypothesis places newborn imitation in the context of the general, basic functioning of association by similarity, and connects it to Piaget's theory of the genesis of imitation through assimilation (section 3.1). Furthermore, the similarity hypothesis endorses skepticism toward interpreting newborn imitation as entailing a form of social cognition (section 4.2); yet it combines well with the framework constituted by phenomenological insights about social perception (section 5).

[22] In newborn imitation and social perception, association by similarity between self-other bodily activities has two different functions (to motivate an action possibility and to ascribe subjective experiences, respectively). Strictly speaking, it is not possible to exclude that the newborn ascribes subjective experiences to others when presented with modeled acts, but this is not necessary to explain imitation. Association by similarity may awaken a motor possibility before all conditions for the perceptual ascription of subjective experience to others are in place. After all, from the point of view of world-infant interaction, there is nothing extraordinary in the idea that specific motor tendencies are awakened by external stimuli.

The similarity explanation states that modeled acts reawaken motor habits that begin to be acquired during the prenatal period; the visual perception of the model includes supramodal features that are habitually associated with specific motor components in spontaneous activity. This hypothesis has advantages with respect to parsimony and simplicity. Compared to the nativist interpretation of mirror links, the similarity model does not have to postulate additional evolutionary processes for the translation of the visual into the motor. Compared to the AIM hypothesis, it does not have to postulate mechanisms of comparison and recognition, nor does it call for an extrinsic motive for the matching act (i.e., testing others' identity). In the association by similarity hypothesis, newborn imitation becomes intelligible as a relatively expectable and non-extraordinary kind of reaction given a stimulus that evokes a similar behavior of one's own.

It is up to experimental psychologists to excogitate ways to test the hypothesis proposed in this paper. Where the findings do not allow one to choose between competing hypotheses, considerations of parsimony and simplicity should play an important role. Research on how, in early infancy, action understanding depends on action production and, more generally, on how similarity of behavior in social interaction may ground social perception may be able to strengthen the similarity hypothesis of newborn imitation; indeed, it may provide a developmental context where the association between the behaviors of self and others is known to operate at levels of increasing complexity. Considering the basic character of association by similarity, comparable findings can be expected in non-human species.

To sum up, newborn imitation may be a significant phenomenon where one could test the basic functioning of association by similarity in the interaction between an infant and its environment; this basic functioning may later be supposed to be in place in primitive social perception.[23]

[23] As far as the research on imitation is concerned, one question is whether similarity is not also involved in later imitative capacities, as Piaget's work suggests (section 4.1). In infancy, the tacit association with actions already accomplished would make it possible to perceive others' actions as actions that can be re-executed, which would open the way to imitation. Explaining the development of imitation through association by similarity would in part compete with the Associative Sequence Learning model (ASL), which relies on association by contiguity. The association by similarity explanation has an advantage: it does not have to postulate that in order to be able to imitate x, an infant must have seen x *while* it was doing x (contiguity). In fact, it is not uncontroversial that "our developmental environments have exposed us to more matchi, x–x, than non-matching, x–y, sensorimotor relationships" (Ray and Heyes 2011, p. 97) and that the greater frequency of x-x relationships would be significant enough to make children able to imitate.

Lastly, with regard to the definitional issue, the association by similarity hypothesis is not committed to the claim that newborn imitation is a case of imitation proper. However, association by similarity might be one of the elements that must be at least implicitly presupposed for an act of imitation proper.

CHAPTER 3

DO INFANTS COME TO EXPERIENCE OTHERS THROUGH "PAIRING"?

Introduction

The conscious experience of infants is not taboo for science. Neuroscientists raise the issue of when conscious experience arises in humans (Dehaene & Changeux, 2011; Kouider et al., 2013; Lagercrantz & Changeux, 2009). Psychologists problematize the subjective experience of infants and make it a topic of their investigations (Stern, 2010; Trevarthen, 2011; Trevarthen & Reddy, 2007). Furthermore, there are both scientists and philosophers who claim consciousness is present in a wide range of animals including fish, arthropods, and octopuses (Allen & Trestman, 2014; Ginsburg & Jablonka, 2007; Mather, 2008; Tye, 2000), which suggests that subjective experiencing may be ascribed to forms of life very different from adult humans capable of linguistic reports. However, it is clear that the investigation of infants' experience presents special difficulties, due to the impossibility of communicating verbally with them and the very different kind of life they live. Hence, it seems sensible for science to integrate a good deal of philosophical analysis, especially for tackling methodological and definitional problems relating to subjective experience. But from what kind of philosophy can we start? Is there a philosophical tradition that claims to be particularly helpful when it comes to subjective experience?

As Gallagher and Zahavi (2012) have argued, 20th-century phenomenology has developed methodologically controlled, systematic ways to investigate experience from the first-person perspective. As many scholars have emphasized (e.g., Cerbone, 2012; Hopkins, 2010; Moran, 2000), phenomenological methods must be sharply distinguished

from introspection, a procedure that was legitimately driven out from scientific psychology. Phenomenologists like Husserl, Scheler, Gurwitsch, or Merleau-Ponty have always criticized introspection and the assimilation of phenomenology to a form of introspectionism. Moreover, their work has often presented strong connections with the best scientific psychology of their time. Thus, the phenomenological tradition is a prima facie legitimate candidate for providing us with appropriate tools and ideas to address the subjective dimension of mental life. Specifically, phenomenological analyses might contribute to the identification of basic forms of consciousness, and describe the processes by which these basic forms give rise to complex contents of awareness. Indeed, phenomenologically-oriented philosophers do try to formulate scientifically informed hypotheses on what the experiential contents in the early stages of human life might be (Bornemark, 2013; Gallagher, 2005; Sheets-Johnstone, 2011). They also seek to determine the ways experience develops into the rich, complex forms of adult human life (Zahavi & Rochat, 2015).

In this chapter, I rely on the wide literature that in recent years has aimed at clarifying the phenomenological methods and at showing how they can be combined with cognitive science for a more comprehensive understanding of the mind (Gallagher & Zahavi, 2012; Schmicking & Gallagher, 2010; Thompson, 2007). Because the methodological presuppositions for this study have already been explored in this literature, I do not engage in extensive methodological discussions. Instead, I put into practice an interdisciplinary investigation of infants' mental life that aims at contributing to both the fields of phenomenology and of cognitive science. I take a theory from the phenomenological tradition, just as we find it in two of its major exponents (Husserl and

Merleau-Ponty), and I discuss whether this theory applies to infants' cognitive development.

The particular aspect of development I investigate is how infants come to experience others as minded beings. To put it in a formula I employ as being equivalent, the problem is how infants come to attribute mental states to others. To tackle this problem, I examine the phenomenological theory of "pairing"—also referred to as "coupling." Simply stated, pairing is a perceptual process by which self and other are experienced as a "pair." However, on a closer look, pairing proves to be a rather complex notion. Thus I discuss a few preliminaries that are necessary to elucidate the idea. Even in phenomenology, the theory of pairing is not uncontroversial. By testing this theory against the empirical case of the infant, my goal is to strike a blow in its favor. At the same time, I intend to show that the theory of pairing throws a new light on empirical data in infant social cognition and calls into question assumptions made by contributors to this field.

The chapter counts three parts. The first part is a relatively long preparatory discussion (1). After making some brief methodological remarks (1.1), I examine a basic dynamic of ordinary perception (1.2). Then, I present pairing as a theory of social perception (1.3). The need for such preliminaries comes from the complexity of the theory of pairing. In the second part (2), I survey cognitive operations and experiences that precede pairing in the order of development. In particular, I consider neonatal imitation (2.1) and describe the first two months of postnatal development as a period where no mental state attribution takes place (2.2). Finally, in the third part (3), I tackle how pairing actually occurs in development. Specifically, I argue that pairing is involved

in action understanding (3.1) and that infant-caregiver interactions are crucial processes from which pairing ensues (3.2).

With the exception of a conclusive remark, I do not examine the differences between pairing and the standard competitors in social cognition, i.e. Theory Theory and Simulation Theory. A critique of these accounts from the point of view of phenomenology has already been carried out by other authors, who sympathize with the theory of pairing or are not opposed to it (Gallagher & Zahavi, 2012). I also agree with Bohl & Gangopadhyay (2013, p. 215), who argue that phenomenological proposals may open up "a space for fruitful discussions" with traditional accounts. Therefore, I focus on a detailed examination of empirical findings and, in subsection (2.2), I introduce what I take to be a more significant theoretical opposition, the opposition between pairing and nativism.

1. Method and Theory

1.1. Methodological remarks

As already stated, I refer to the literature mentioned above for extensive discussions of the interaction between phenomenology and cognitive science. However, a few methodological remarks are necessary in order to understand the sort of investigation pursued in this chapter. This subsection makes clear that such interdisciplinary investigation lends itself to a twofold reading: a specifically phenomenological reading and a cognitive-psychological one.

I start with a statement by Thompson (2007) indicating a key task of phenomenological philosophy: "Phenomenology is anchored to the careful description, analysis, and interpretation of lived experience" (p. 16). Here, the expression "lived

experience" (German *Erlebnis*; French: *vécu*) is of crucial importance. By "lived experience," phenomenologists refer to what is otherwise called "phenomenal experience." Bodily impulses, kinesthetic sensations, intentions, emotions, perceptions, thoughts, recollections, etc. are all lived experiences insofar as they are phenomenally experienced. To recast Nagel's famous phrase, "it is like something for someone" to undergo a lived experience. Accordingly, lived experience is a technical expression for what is also called "consciousness" or "subjective experience." However, it is indispensable to keep in mind that the notion of lived experience includes minimal forms of phenomenal experience: these can be pre-reflective, bodily, extremely transitory, and present focused (Gallagher & Zahavi, 2012). Phenomenology opposes intellectualistic ways of thinking that make consciousness depend on "linguistic reportability," "reflective awareness," or "explicit attention."

In this chapter, the idea that infants undergo some sort of lived experience is taken as a point of departure. Indeed, in line with the phenomenologists' emphasis on the "life-world"—i.e., the world of perceptual and practical experience (Husserl, 1999; Merleau-Ponty, 2012)—I consider what is presented in ordinary experience as a legitimate starting point for philosophical and scientific inquiries. When we see infants crying, sucking, moving, smiling, etc., we cannot help experiencing them as undertaking corresponding lived-experiences. We experience these forms of behavior as expressive (Zahavi, 2007; 2011) and this experience may ground reasonable hypotheses on what is lived through by the infant. In general, the acknowledgment of ordinary experience and the life-world functions as a reminder that the world contains more than what current empirical sciences have already managed to measure.

I call "phenomenological-psychological" a reconstruction of the infants' lived experience based on the interpretation of its behavior. Phenomenological-psychological reconstructions are never more than hypothetical and are always open to revision. This chapter strives for the most plausible reconstruction given the currently available behavioral data. Moreover, it is one of its main methodological assumptions that phenomenological-psychological reconstructions must be compatible with evolutionary psychology and contemporary neuroscience. In particular, we grant the right of veto to neuroscience in the sense that a phenomenological-psychological reconstruction that is considerably implausible given what we know about the brain should be rejected.[1] However, we also need to be aware of a methodological caution inherent to the neuroscience of our particular topic: it is not possible to simply take for granted that functions that in adults are substantiated by specific neural structures and mechanisms are instantiated by the same structures and mechanisms in the early forms of human life (Anand, 2007; Fitzgerald, 2005; Nagy, 2011).

Despite the scientific studies of infants' conscious experience mentioned in the introduction and despite the fact that a phenomenological-psychological investigation may be constrained through and through by a variety of empirical data, one might still be skeptical of interdisciplinary inquiries explicitly directed at consciousness. The present chapter meets this sort of skeptical concern by lending itself to a twofold reading. On the

[1] Obviously, on issues involving consciousness, there is disagreement between neuroscientists and also between philosophers interpreting neuroscientific data. And it is certainly a good thing for scientific progress in this field that there exist different, competing hypotheses. When I say that I grant the right of veto to neuroscience I mean that there must be at least one legitimate and plausible way of interpreting neuroscientific data that is compatible with the phenomenological-psychological reconstruction I propose. It must be possible for a neuroscientist who knows the complexity of the neuroscience of consciousness to accept the legitimacy of my phenomenological-psychological hypothesis. However, it is not at all necessary that every (or most) neuroscientist endorse my hypothesis.

one hand, one can maintain a phenomenological-psychological standpoint and focus on the attempt to reconstruct the lived experience of infants. The goal of maintaining this standpoint is to establish whether the theory of pairing is valid *as a theory of lived experience*. On the other hand, one can adopt a cognitive-psychological point of view and consider the processes under inquiry as cognitive operations investigable through the methods of cognitive science, regardless of whether they involve lived experience. The goal of this second standpoint is to appreciate the implications of the theory of pairing for infant social cognition, without presupposing a way of theorizing extraneous to cognitive science.

The possibility of such a twofold reading relies on the generally accepted assumption that processes of phenomenal experience (*Erlebnisprozesse*) are correlated to cognitive processes with a physical implementation. It follows from this assumption that where a phenomenological-psychological approach *correctly* identifies conscious processes, cognitive sciences are able, at least in principle, to identify correspondent cognitive processes. As a consequence, skeptical concerns with regard to phenomenological-psychological reconstructions can be accommodated by reformulating hypotheses about lived experience in terms of hypotheses about cognitive processes. Specifically, the phenomenological theory of pairing can be translated into a model of basic social cognition: in this regard, this theory is no different from the kinds of cognitive models ordinarily proposed by psychologists. The goal of such models is to explain observable behavior. They postulate cognitive processes that are realized by physical (usually neural) processes, without presupposing a conscious counterpart for these processing. Therefore, if one is skeptical about reconstructions of lived experience,

he or she can still assess the explanatory power of the cognitive processes that are postulated following the input of a phenomenological theory. For the reader trained in cognitive science, the cognitive-psychological reading will flow, so to speak, naturally as the discussion of behavioral findings proceeds.

For space limitations, these methodological remarks had to be brief. In substance, I can only apply the method and let the reader judge the results.

1.2. Similarity and transfer in perception

Pairing is a perceptual process. Accordingly, in order to understand pairing, it is important to be familiar with a general dynamic of perception of which pairing is a particular instantiation. This general dynamic can be described as follows: association by similarity generates "transfers." In the present subsection, I specify the meaning of such a formula by relying on the theories of perception of Husserl and Merleau-Ponty. I also show that the transfer-producing function of similarity is a widely accepted feature of perception, even though contemporary philosophers and cognitive scientists do not employ this terminology.

Allen (2012) has suggested that among the principles of association originally enumerated by Hume (2000), similarity is the one that has been unjustly neglected. Arguably, scientific psychology has appropriated the principles of contiguity and cause-effect under the titles of "classical conditioning" and "operant conditioning" respectively. Yet, on closer inspection, both classical and operant conditioning imply the functioning of similarity. For it suffices for a stimulus to be similar to a specific set of past stimuli for it to provoke a specific learned response. In other words, it is through the notion of "stimulus generalization" that similarity invariably re-enters the picture (Allen, 2012).

In fact, association by similarity has been recognized as a fundamental psychological process (Shepard, 1987; Vigo & Allen, 2009) and has been studied in sophisticated ways (Nosofsky, 1992; Tversky, 1988; Vigo, 2009). It has been called the "factotum" of cognition because it plays a central role not just in stimulus generalization, but also in a number of psychological phenomena such as categorization, recognition, memory retrieval, gestalt organization, analogical and inductive reasoning, problem solving and decision (Larkey & Markman, 2005). In another chapter, I have argued that the functioning of similarity is a very ancient evolutionary acquisition (second chapter of this dissertation). Relatively simple organisms must be able to determine their behavior in the face of a new situation on the basis of the experience of similar situations in the past (Shepard, 1987). Notably, the notion of similarity has undergone a healthy critique, from which it came out reinvigorated (Decock & Douven, 2011).

To appreciate how similarity is at work in perception, let us turn to phenomenology, starting with descriptions originating in Husserl (1999). In everyday experience, when we encounter objects in perception, we experience them from the outset as having a familiar meaning, i.e. as tables, chairs, cars, dogs, trees, buildings, etc. A car parked on the street is seen "at a glance" as a car. However, at the beginning of the perceptual encounter as at any other moment, what is directly experienced is just a particular perspective on the car. Say that, initially, only the car's left side is sensorially experienced. It is nonetheless clear that perception presents me with a car, the entire car, not just with a colored surface. The object of perception is a complex unity: it includes the car's left side, but also the sides I expect to see if I walk around it. In other words, perception implies expectations that go beyond the present sensory stimulus. For

example, I expect the car to have a certain solidity or to produce a certain sound if I beat my hand over it; I also expect what I see to be the kind of thing somebody can enter and drive away with. In short, perception raises a problem: if the sensory stimulus represents only a part of what perception presents me with, where does the "*surplus*" come from?[2] Why, given the present array of sensory data, do I undertake the specific expectations that constitute the percept "car," instead of undertaking the expectations relative to a dog or a tree?

Here is where similarity comes into play. I experience the object immediately as a car, even before experiencing its other sides, because the present sensory experience is similar to experiences I had of cars in the past. My previous experience of cars comprises a totality of elements: when current experience presents a sufficient combination of those elements, a car, not just parts of it, is perceived. What is sensorially given in the present is apprehended in light of experiences that included a similar sensorial given in the past.

The example of perceiving a car shows that perception includes both the current sensory stimuli and *other* components.[3] These other components are "transferred" from past experience. *The transfer is then simply the process by which perception combines current sensory stimuli with elements previously experienced.* This combining process is not arbitrary; rather, it follows the law of similarity: it tends to provide only those elements that have been presented in a similar experience in the past. For instance, the present elongated shape can be combined only with other components of the past experience of cars, where similar shapes were present. Husserl's (1999) famous example

[2] Cf. Dweyer, 2007.

[3] Cf. Fuster, 2003, p. 84: "every percept has two components intertwined."

is the child perceiving scissors: after learning the practical meaning of scissors, in a novel situation the child immediately perceives a new pair as scissors, even though nobody is currently using it. That is: the child immediately grasps the object as having a specific practical functionality because this functionality has been experienced on similar objects in the past.

Merleau-Ponty's (2012) emphasis on how habits are involved in enactive perception helps us generalize the point. Specific stimuli evoke specific responses. Why? Because the subject is used to situations where the same kind of stimuli are integrated in a certain type of activity. When I sit at my pc, a certain motor space is opened beneath my hands; the same would not happen to an Aboriginal Australian alien to the pc writing practice.

Phenomenological descriptions make us understand what might be misleading in the usual way of conceiving of similarity. A prototype of association by similarity is when, in conversation, a narrated episode reminds us of a similar episode we have experienced. However, when a subject perceives a car as a car or scissors as scissors, or becomes ready to act in a particular way, it is not "reminded" of past exemplars or situations; it does not have to recollect them, nor to become aware of their similarity with the given object or situation. Instead, the subject is directly presented with an object whose features are more than what is given in a momentary perspective; or it directly experiences its own motor response as motivated by the environment. Similarity, then, operates tacitly in providing a comprehensive meaning for the perceived object or in facilitating a course of action.

If one objected that similarity is something too vague and inflationary for playing a role in perception, I would refer the objector to the literature mentioned above. Moreover, I would stress the fact that I immediately apprehend a set of visual data as a car. I see a car at first glance, without having to go around it. And I would ask: are these particular visual data similar to those I experience when I perceive other kinds of objects, so that similarity could make me perceive a dog, a tree or a building just as much as it makes me perceive a car? Evidently not! In most cases of everyday experience, the data for which I experience a certain kind of object are similar solely to the data characterizing the past experience of that kind of object. Hence I usually don't have any doubt about what kind of thing is in front of me. There are of course cases of perceptual ambiguity. In artificial cases (e.g., vase or faces?), the number of possible percepts is restricted by the sensory data, which may be interpreted as presenting one percept or the other. It is precisely because the data have similarities with those presenting a restricted number of percepts that those percepts (and not others) are possible for me. In more natural situations (e.g., donkey or mule?), it is precisely because what I see is similar to objects of different kinds that I experience ambiguity. Yet, because a full treatment of this topic is beyond the scope of this chapter, I cannot give more than these quick remarks to defend the claim that similarity helps account for both perceptual ambiguity and unambiguity.

We can be aided in identifying the tacit functioning of similarity in shifting from phenomenology to cognitive science. Specifically, neural networks allow us to model the development of perceptual habits by adopting the Hebbian principle "units that fire together, wire together." Without delving into the details of Hebbian learning, we recall

that the activation of a cell assembly due to sensory input represents an elementary bit of information. In repeated perceptions, cell assemblies that are activated together become associated (i.e. the weights connecting the nodes increase). Hence, once the associations have been established in learning, the activation of a cell assembly due to sensory input facilitates the activation of associated assemblies. The sequential activation of cell assemblies represents the integrative mode of information processing corresponding to perception. In this model, a cell assembly may become active in the absence of the relative sensory input; such activation may be understood as the expectation of sensory input constituting the momentary phase of perception (Mongillo, 2012). Moreover, if cell assemblies are associated to assemblies producing outputs, assembly activation facilitates motor response, which smoothly accounts for enactive perception (Dreyfus, 1996).

Incidentally, I note that a large body of experimental evidence supports the biological plausibility of Hebbian plasticity (Sommer, 2012) and that Hebbian learning is thought to play a critical role in development (Munakata & Pfaffly, 2004). For the present purposes, it is important to emphasize that activation of the same cell assemblies in different perceptions over time *is* the similarity between those perceptions. In the connectionist model of perception I just sketched, there is no trace of a recollection that would accompany the present perception.[4] Indeed, in a sense, no "stored memories" are needed because what is preserved over time is not the low activation of some cell assembly, but merely the strength of connections. The activation of cell assemblies due to

[4] For more about how similarity is involved in pattern completion and generalization see Trappenberg (2010).

the joint action of currently active assemblies and strong connections is what I previously called "transfer."[5]

There is plenty of theorizing in cognitive science and in the philosophy of cognitive science that testifies to an at least implicit acceptance of similarity's transfer-producing function. Despite their differences, all following theories accommodate the same assumptions: (1) perception entails combining sensory inputs with components deriving from past experience; (2) the combining process depends on features of the present stimulus that are in common with specific past perceptual experiences. Thus, in Meyer and Damasio's (2009) theory of convergence-divergence-zones a particular "fragment of information" acts as *the common trait* that causes the association with the other fragments relative to a certain object. In Barsalou (2008) similar stimuli trigger perceptual states stored in memory. Predictive coding is about producing the most apt predictions given the present context of sensory data in a way that keeps track of the regularities of the environment (Clark, 2015; Van de Cruys, 2011). Finally, the literature on cognitive penetration describes how early sensory processing is influenced by non-arbitrary activation of contextual expectations and memorized patterns (Vetter & Newen, 2014).

To transfer components of experience to novel experiences means to assimilate the new to the already experienced. To conclude this excursus on ordinary perception, I

[5] Rejecting a naïf notion of similarity, James (1981) formulated the "law of neural habit" as the fundamental law of association of which the principle of similarity is but an expression. James's law has an unmistakable connectionist flavor and I am totally sympathetic with his account. The idea that similarity may be reduced to a more fundamental law does not entail that similarity is a useless principle. In fact, the similarity principle helps us identify relations between experiences that cannot be captured by classical or operant conditioning. Whereas contiguity suggests a relation between two experiences occurring in the current situation (e.g. the bell sound and expected food), similarity primarily relates a current experience with a past experience (a similar bell sound in the past, which was followed by food). The past experience is not recollected, but underlies the apprehension of the present one.

note that both in Piaget (1952) and in phenomenology (Cairns, 2007) assimilation has been recognized as a fundamental tendency of mental life. This should prepare us to identify assimilating processes beyond what has been discussed so far.

1.3. The theory of pairing

Pairing is a perceptual process that involves a transfer just as in any other ordinary perception. Yet the content of the transfer is of a specific sort. What comes to part of the percept through the transfer is "lived experience." In essence, pairing is the perceptual process by which we apprehend others as mental or minded beings.

On the one hand, the theory of pairing aspires to a somewhat foundational role. It represents a solution to the basic problem of why and how certain things appear as minded beings whereas other things as non-minded. If we consider infant cognition, it is a generally accepted fact that at around nine months of age infants attribute mental states to certain beings but not to others (Rochat & Striano, 1999; Astington & Hughes, 2013). This simple fact invites the question of how such a situation comes about, and pairing—being a theory of how sensory stimuli are selectively interpreted in terms of mental content—provides an answer.

On the other hand, one should not force the theory outside of its legitimate domain(s) of application. The field of social cognition is much greater than what is addressed by the theory of pairing. For instance, when a child says "my friend thinks that…," this requires more than pairing. Consequently, in order to avoid fallacious generalizations, I restrict the investigation to a basic level of mental state attribution and remain neutral on claims concerning higher, more complex levels. According to contemporary developmental psychologists (Astington & Hughes, 2013; Brooks &

Meltzoff, 2014; Reddy, 2008), the first mental states that infants attribute when they start experiencing others as minded beings are intentions, emotions, and perceptions. These terms have to be taken in a somewhat loose sense. For example, "intention" is mainly the state of "intending" a goal in a bodily act and may entail a reference to the "desiring" implied by the striving for something. To the list of mental contents infants initially attribute, one might add a general feel of the acting body, a body schema. Attributing a body schema simply means that the other's body is perceived not as a mere material body, but rather as a body that is lived from within.[6] The attribution of a body schema seems to be implied by the attribution of a series of bodily intentions and is also treated as basic by phenomenologists (Husserl, 1999; Merleau-Ponty, 1964b). Hence, to make sure that I do not stretch the notion of pairing beyond its appropriate field of application, I take paring to be no more than a theory of how a subject comes to attribute (some) intentions, emotions, perceptions and an overall body schema to others.

Note that I call these mental contents "lived experiences" or "mental states" indifferently. The reader can replace one expression with the other according to the point of view he or she wants to pursue. However, it is important to emphasize that there is a distinction between low-level and high-level mental state attribution (e.g. Goldman, 2009). Low-level mental state attribution concerns motor intentions, emotions, or perceptions. High-level mental state attribution refers primarily to beliefs and desires. In

[6] As Gallagher and Zahavi (2012, p. 165) put it, "the concept of body schema includes two aspects: (1) the close-to-automatic system of processes that constantly regulates posture and movement to serve intentional action; and (2) our pre-reflective and non-objectifying body awareness." My phenomenological-psychological reconstruction refers to the second aspect of the notion of body schema. According to my hypothesis, the other's body does not appear as a minded body "intermittently," as if it suddenly became minded each time it displays a particular action or expression. Rather, the infant's "pre-reflective and non-objectifying body awareness"—which is characterized by a relatively sustained continuity—is in the background of its experience of the other as a minded being. There is a sense that the other's body is animated by subjectivity in a relatively continuous manner.

this chapter, I discuss the theory of pairing as a theory of low-level mental state attribution. Thus, it must be kept in mind that in asking how early mental state attribution comes about I target low-level mental state attribution specifically.

The essential elements of the theory can be found both in Husserl (1999) and Merleau-Ponty (1964a, 1964b, 2010). Despite the many differences between these two phenomenologists, their texts point to a core of the theory that both authors endorse.[7] The theory runs as follows: a bodily being other than myself is experienced as a minded being because its bodily existence is associated to my own bodily existence, and this association is based upon the similarity between the two. This association motivates the transfer of lived experience from my own organism—which presents itself as impregnated with lived experience—to the other's body. In other words, the perception of the other as a minded being depends on experiencing one's own behavior and the other's similar behavior. At least in most cases, this similarity includes "a similar *directedness*" to the environment (De Preester, 2008, p. 136). The following quotation from Merleau-Ponty (1964b) helps make the point:

> I can perceive, across the visual image of the other, that the other is an organism, that that organism is inhabited by a "psyche," because the visual image of the other is interpreted by the notion I myself have of my own body and thus appears as the visible envelopment of another "corporeal schema" […]. To the extent that I can elaborate and extend my corporeal schema, to the extent that I acquire a

[7] In some of the texts I referred to Merleau-Ponty is critical of Husserl's theory of intersubjectivity. Yet Merleau-Ponty is never critical of the idea of pairing, which he appropriates with his unmistakable style and terminology (cf. 1964a, pp. 94-95, 168-170; 1964b, pp. 117-121; 2010, p. 28, 32, 332; 2012, p. 370). De Preester (2008) goes in the right direction when she claims "Merleau-Ponty's account is in fact no alternative to Husserl's account" (p. 140).

> better organized experience of my own body, to that very extent will my consciousness of my own body […] lend itself to a transfer to others. And since at the same time the other who is to be perceived is […] a system of behavior that aims at the world, he offers himself to my motor intentions and to that "intentional transgression" (Husserl) by which I animate and pervade him. (p. 118)

I experience the other as a minded being because I perceive her on the basis of the experience of my bodily behavior, which shares commonalities with the one of the other and is originally experienced as impregnated with lived experience.[8]

Pairing entails a bidirectional transfer: the experience of the other as a minded being generates an experience of myself as a minded being of the same kind as the other. For example, I start experiencing myself as having the same behavioral possibilities of the other. As Zahavi (2014) rightly emphasizes, the transfer is "reciprocal" (p. 133). However, this reciprocity does not exclude that a closer look might reveal certain kinds of asymmetries. Both Husserl and Merleau-Ponty recognized an asymmetry that can be formulated as follows: however greatly the experience of the other may influence the experience of myself, I cannot transfer "lived experience" from the other to myself if I have not first ascribed "lived experience" to the other; yet it is possible to experience one's own bodily activity as impregnated with lived experience without having

[8] It is very important to emphasize that the theory of pairing does not at all imply that the experiences of others are first-personally given. On the contrary, precisely because it requires a transfer, it shows that the other's experiences are not first-personally given. Experiences that are first-personally given require no transfer. The theory of pairing implies no "projection" in the sense of a mere extension of the self into the other. When I perceive someone else's intention to grasp something I do not experience this intention first-personally. I perceive an intention; I do not perceive an intention of mine. The first-personal character of experience is not transferrable; it is only the general characters of experiences—which cut across my experience and your experience—that can be transferred.

experienced the other as a minded being. In this precise sense, the transfer of lived experience in the self-other direction precedes the transfer of lived experience in the other-self direction.

For Husserl (1999), this priority of the self-other direction is related to the circumstance that the "most original" (p. 103) way in which lived experience is given is the first-personal awareness of one's own experiences (see Nenon, 2007 or Zahavi, 2010 for explanation). Thus, the experience of the lived experiences animating one's own behavior comes first—at least in a "logical" order. Merleau-Ponty argues for the priority of the experience of one's own lived bodily behavior on developmental grounds. In his discussion of the developmental psychology of his time, he claims "the perception of one's own body precedes that of the other" (Merleau-Ponty, 2010, p. 248). In infants, the experience of one's own bodily behavior has to come "earlier" in order to make the perception of the other possible (Merleau-Ponty, 1964b, p. 121). Of course, infants experience others from the very beginning. However, initially they do not experience them *as* endowed with lived experience; rather, they experience others merely as something that makes them emotionally "complete" (Merleau-Ponty, 1964b, p. 124). Following Wallon, Merleau-Ponty fixes the beginning of the experience of others as minded beings at six months.

In this chapter, I focus on the transfer in the self-other direction because my goal is to understand how, in early stages of development, mental states are attributed to others. However, it is also important to mention another aspect. When I perceive the other as a minded being, I am constantly present, as "here." The other belongs to a perceptual field of which I occupy the center of orientation. In virtue of the similarities

self and others entertain, they are experienced as constituting a single configuration, a system or "pair." We can call such a system a "we." Bearing in mind that pairing entails the constitution of a we-system is indeed indispensible, since the process of coming to perceive the other as a minded being is not something in which the infant figures as a disengaged, distant observer. As we shall see, the infant itself appears as an active participant in the infant-caregiver interactive system.

The theory of pairing must not be conflated with the traditional model of the "inference by analogy." This model postulates that one first experiences one's own behavior, then *notices* the similarity with the movements of others, and finally *infers* that others must also have experience. Pairing is utterly different for at least two reasons. First, in pairing there is no perception of the physical aspect of others *before* or *as separate from* the attribution of lived experience to them; on the contrary, the perception of others includes the transfer of lived experience from the start. The idea that pairing involves a transfer just as any other ordinary perception should suffice to make it clear that there is nothing intellectualistic in it. If transfers take place in all perceptions, why should a transfer not occur in the perception of the other?

Second, similarity motivates the transfer of lived experience, but does not necessarily figure as a content that is perceived. Indeed, *similarity is a principle that regulates experience, but does not have to become conscious itself*. When I perceive an object at first glance as scissors, I do not compare it with scissors experienced in the past to find some similarities. Indeed, I don't give the slightest thought to other exemplars of scissors. In the same way, when a subject comes to perceive the others' behavior as

expressive of mental events, there is no thought of the similarities with one's own behavior. In both cases, similarities do exist, but they operate in a completely tacit way.[9]

As already mentioned, the theory of pairing is not uncontroversial in phenomenology.[10] One reason for resisting the theory is that it is not clear how in fact the perception of the other may arise naturally from relatively simple systems of experience and through the ordinary dynamism of perception. By examining the infant's experience in detail, I address precisely this kind of reservation. If the theory of pairing captures the dynamic through which the infant comes to perceive the other as minded, then pairing must be able to account for the *earliest* perception of this kind. For this reason, it is necessary to study the earliest stages of human development. In the next section, I argue that in the earliest stages of development there are experiences and cognitive operations that provide the foundation for the occurrence of pairing.

2. The Preconditions of Pairing in the Order of Development

2.1. The revelatory function of neonatal imitation

In starting our inquiry on whether the theory of pairing applies to infant development, we are faced with a problem concerning the idea of similarity. It is not enough to identify common traits in the behaviors of infant and caregivers; one has to show that these similarities may in fact determine the infant's cognitive operations. To deal with this problem, in this subsection I discuss the phenomenon called "neonatal imitation." Indeed, according to an explanatory model I proposed in another chapter (under review), neonatal

[9] Husserl (1999) remarks that in cases of perceptive configuration as a pair (e.g. two red stains on white wall), the elements constitute a unity "regardless […] of whether they are noticed or unnoticed" (p. 112). We may add that in order to perceive such unities it is not necessary to identify the similarities subsisting between the paired elements.

[10] For some of the common objections that are raised against the theory of pairing see Barber, 2013.

imitation reveals that the relation of similarity between the action of self and others plays a key role in conditioning the neonate's behavior. To be clear, in my view neonatal imitation is not pairing and does not entail pairing. However, it is usefully discussed in this context because it witnesses to the functioning of association by similarity, which is a necessary (but not sufficient) precondition of pairing.

If we give credit to the empirical evidence on neonatal imitation (Meltzoff 2005; Nagy et al., 2005; but also see Jones, 2009 for critical voice), the fact that has to be explained is that neonates imitate 7 different motor acts (cf. second chapter). Most challenging of all is the so-called "correspondence problem," i.e., the explanation of why the neonate responds to act x with act x instead of with any other act y that is also in the infant's repertoire. For example, the infant tends to respond to mouth opening with mouth opening, not with finger movements. I suggest that modeled acts reawaken the corresponding motor habits in virtue of an association by similarity (cf. second chapter).

My proposal endorses two key ideas of Meltzoff and Moore's (1997) explanatory model. First, the representations of executed and visually perceived acts share common elements. Meltzoff and Moore (1997) identify the common elements in "configural relations between organs" that are experienced both proprioceptively (for oneself) and visually (for the other) (p. 184). Their identification of common elements can be enriched by providing more details about the relevant proprioceptive and visual representations (cf. second chapter). Second, the neonate has sufficient proprioceptive experience of the motor acts in question before it imitates. Meltzoff and Moore call the repeated and habitual execution of the relevant motor acts "body babbling." They claim it is something that starts prenatally. The data I review (cf. second chapter) confirm that all 7 acts

imitated after birth correspond to established motor habits in the last months of pregnancy. In fact, the frequencies of spontaneous execution of the relevant motor acts across the perinatal period are comparable.

However, there are also crucial differences between my proposal and Meltzoff and Moore's (1997) model. The most important difference concerns their assumption that the neonate has to undertake a *comparison* between the perceived act and its current bodily state. The comparison's function is to detect similarity or dissimilarity. When the perceived act and the neonate's own bodily state present the same configural relation, this computational process yields a "match" result, meaning that the infant recognizes the equivalence between the acts of the self and the other. This *recognition* leads the infant to a primitive sense that the other is "like me." The consequence of this comparison/recognition assumption is that neonatal imitation becomes a way to justify the claim that "social cognition begins in the newborn period" (Meltzoff, 2013, p. 139). The "sense of similarity" between self and others would be an early implementation of social cognition.

I reject the comparison/recognition assumption. For similarity to be operative, it does not have to be recognized. That is: there is no need of a computational process that targets similarity, giving a positive result ("match") when it occurs, and a negative result ("mismatch") when it doesn't. On the contrary, just as in Hebbian learning, if a configural relation—to use Meltzoff and Moore's language—is associated to a motor representation in spontaneous habitual activity, then, when the configural relation is visually presented, it will tend to activate the associated motor representation. The activation tends to follow naturally because the representational units involved are "wired

together." Hence, in my hypothesis, Meltzoff's (2013) motivation for claiming that social cognition begins in the newborn period is undermined. More parsimoniously, I suggest that neonatal imitation is a kind of action priming based on the commonalities between modeled and habitually executed acts.[11]

For an extensive discussion of why my "association by similarity hypothesis" is preferable to Meltzoff and Moore's and other models, I refer to the chapter I devoted to this topic (i.e., the second chapter of this dissertation). Here I observe that we should not be surprised that neonates may associate their experiences to prenatal experience. There are plenty of studies that document how neonates can discriminate experiences had before birth in the domains of audition, taste, and smell (see Hepper, 2015 for a recent review). The case of the mother's voice is particularly suggestive: "although the mother's voice is altered as it passes through the abdomen, sufficient information is preserved to enable the fetus to learn its mother's voice and discriminate that voice from the voices of its father and other females" (Hepper, 2015, p. 40). Although somewhat distorted, the mother's voice before birth presents enough similarities to the voice heard after birth such that the latter can be discriminated. Thus, the kind of association that underlies neonatal imitation is not an isolated phenomenon.

So far, what has been suggested remains at the level of a cognitive-psychological explanation indifferent to any assumption concerning lived experience. Yet the present chapter pursues a phenomenological-psychological level of inquiry as well. Therefore, we need to raise the following question: is it plausible that the association by similarity

[11] See Gallese et al. (2009, p. 107) for a further hint to the hypothesis that, during prenatal development, specific connectivity may develop between motor centers and "to-become-visual" brain regions. This connectivity would be able to function as basis for imitation and interpersonal behavior after birth.

underlying neonatal imitation instantiates a nexus between lived experiences? Only if the answer is in the positive, can neonatal imitation be considered as testifying to a kind of association between lived experiences that may play a role in the infant's phenomenally lived perception of others as minded beings. Because the association involves late prenatal experiences, the question inevitably becomes: does the late term fetus undergo lived motor experiences that can be reawakened after birth?

Consider what an early phenomenologist and a contemporary one have conjectured. In a research manuscript in which he tried to describe the development of the perception of minded beings in the infant, Husserl has no reservations toward making prenatal motor experience the starting point of this development. He hypothesizes that the fetus has kinesthetic experience and that, through kinesthetic experience, it achieves a differential constitution of the organs of the lived body. He also suggests that the newborn possesses "experiential acquisitions" (*Erfahrungserwerbe*) developed in its existence in the mother's womb (Husserl, 1973c, p. 605). More recently, resorting to evidence from contemporary science, Gallagher (2005, p. 105) claims: "There is good evidence that proprioceptive awareness develops prenatally" (p. 105). In what follows, I provide some additional argument to corroborate Husserl's hypothesis and Gallagher's claim.

Since the first systematic observations through ultrasound technology in the early 80s, scientific examination of the prenatal period has been increasingly providing a picture of a fetus whose spontaneous behavior becomes more and more complex and who reacts to rich sensory stimulation from extra- and intrauterine environment (Hepper, 2007; 2015; Lecanuet & Schaal, 1996). By 22 weeks gestational age, hand to mouth and

hand to eye movements follow a straight trajectory, where acceleration/deceleration phases seem to be planned according to the size or delicacy of the target (Zoia et al., 2007). At this stage of development, fetuses tend to touch only the parts of the body (lips, cheeks, ears, etc.) innervated with sensory nerve fibres, not the non-innervated parts. Moreover, fetuses explore the boundary between innervated and non-innervated areas in the forehead. As innervation increases and the boundary migrates, the areas explored by the fetus migrates with the boundary. These data suggest that this kind of "scratching" is aimed at provoking sensations in the touched areas or at exploring the autostimulatory differences in the body's surface. Again from around this stage (20th week), fetuses open their mouths before their hands get there, indicating intersensorimotor anticipatory coupling (Myowa-Yamakoshi & Takeshita, 2006). Thumb-sucking and licking starts at 25 weeks (Piontelli, 2010) and coordinated sucking and swallowing at 35 weeks (Piontelli, 2015).

Consider these behaviors and the "reaching to touch" directed to intrauterine wall, placental lining, umbilical cord, or co-twin. Delafield-Butt and Gangopadhyay (2013) argue that prenatal movements are "intentional," or "prospective," in the sense of being guided by the anticipation of future sensory effects. The conspicuous tactile stimulation occurring between twins (Hepper, 2007) is particularly impressive. Indeed, specific patterns for the movements directed to the co-twin compared to the movements directed to the self or the intrauterine wall have been observed (Castiello et al., 2010). But according to Delafield-Butt and Gangopadhyay (2013) even the so-called general movements—which start around 8 weeks and include stretches, whole-body movements, head and limb rotations, etc.—contribute to the acquisition of prospective motor control.

For general movements generate repercussions across the whole body, which can be re-sought for in subsequent motor acts. Indeed, a basic feature of Piaget's description of the initial sensorimotor stages applies to fetal development. As a consequence of a period of non-targeted movements, "the subject tends to generate already performed acts which give it particular sensations" (Piontelli, 2010, p. 69). After all, the supposition that fetuses preserve a trace of what they experience ("retention") is well established (Kisilevsky, 2003; Van Heteren et al., 2000; Hepper, 2015).

Fetal behavior serves vital biological functions such as adjusting tissue growth and neural connectivity, developing joints and muscle tone, preparing for breastfeeding and attachment to the mother as the source of familiar auditory and olfactory experiences (Delafield-Butt & Gangopadhyay, 2013; Hepper, 2015). The new climate of appreciation for fetal behavior and sensitivity lead to reasoning about the fetus's lived experience in certain trends of psychology (Chamberlain, 2013). What is important for our phenomenological-psychological reconstruction is that, in the last trimester of pregnancy, fetal behavior is non-stereotyped, coordinated, and directed at sensory consequences. For a phenomenologist, it would be highly problematic to postulate that a behavior of this kind corresponds to no lived experience. For reasons it would be beyond the scope of this chapter to examine, behavior is taken to be inherently expressive (Zahavi, 2007; 2011) and the separation between behavior and lived experiences is considered to be questionable from an ontological point of view (Merleau-Ponty, 2012).

Recall that we assign the right of veto to neuroscience. What, then, does neuroscience say? Merker (2007) reviewed a broad range of evidence supporting the claim that an upper brain stem system is the lynchpin of primary consciousness. This is a

bottleneck system integrating (1) proprioceptive/exteroceptive information, (2) viscerosceptive motivational processes, and (3) action selection mechanisms, in order to determine coherent behavior. Notably, anencephalic or hydranencephalic children, who have no cerebral cortex but have intact brainstem, pass neurological examinations of consciousness, act purposefully, and enjoy a rich social-emotional life. Moreover, neither ablation nor stimulation of cortical areas alters pain perception in adult humans, whereas thalamic ablation or stimulation does (Brusseau, 2008). This confirms the hypothesis that subcortical structures may be sufficient to support a minimal form of consciousness.

In keeping with Merker (2007) and other studies, Delafield-Butt and Gangopadhyay (2013) locate primary conscious experience in the sensorimotor intentionality controlled by the upper brain stem and manifested in early fetal behavior. They do not indicate a period for the onset of primary consciousness, but it seems that the sensorimotor control of the 20th week would imply such consciousness. Moving from the view that cortical contribution is necessary to the generation of conscious states, the 20th week was judged to be the lowest possible limit for the possibility of consciousness (Brusseau & Myers, 2006). Thus, Delafield-Butt and Gangopadhyay's position amounts to a rather liberal estimate of the onset of consciousness. Because the activity of thalamocortical connections measured through EEG becomes relatively mature at 30 weeks, it was considered safer to hypothesize that consciousness is in place at this age (Anandk 2007; Brusseau, 2008; Brusseau & Myers, 2006). For the purposes of this chapter, it is sufficient to take the latter, more conservative view. Indeed, if we assume that the fetus starts having kinesthetic experiences around the 30th week, then there are more than two months in which the fetus may experience the constitution of motor habits

(a normal pregnancy ranges from 38-42 weeks). It would be very instructive to examine the arguments that have been recently proposed for claiming that only the newborn, but not the fetus, is conscious. However, for space limitations, I cannot engage this discussion.[12]

We can now reformulate in phenomenological terms the hypothesis for neonatal imitation that I defended on a cognitive-psychological level (under review). Prenatal kinesthetic experiences are extremely transitory, but leave traces. They constitute

[12] The main empirical arguments for denying consciousness to the fetus are accurately summarized and defended by Lagergrantz (2014). They are two: (a) the fetus is sedated by neuroinhibitory and sleep-inducing substances such as adenosine, pregnanolone, and prostaglandin D2 (these are substances provided by the placenta or the fetus itself); (b) the fetus is asleep. Note that the disagreement is not on whether fetuses have the neural capacities for being conscious. Lagergrantz does not only acknowledge that the neonate is aware of its body and of some events in the outside world; he also claims that the preterm infant is conscious from about the 23rd gestational week when the thalamocortical connections have been established. Thus, the sources of disagreement relate to the particular condition (intrauterine) and form (sleep) of fetal existence. Before addressing Lagergrantz's arguments, a remark concerning his way of conceiving of consciousness is needed. Lagergrantz (2014, p. 300) claims "consciousness is characterized with access to one's autobiography and mental time, self-description, and self-agency." He denies that REM sleep with dreaming is conscious because it typically occurs without "purposeful movements," "insight" and "self-reflection." He says that for a basic level of consciousness "it is […] important to be awake, to communicate with others, and to express emotions" (p. 302). He then makes "awakefulness" a basic criterion for consciousness and takes Searle's commonsense definition of awakefulness as what we (i.e. adults) typically experience from when we wake up to when we go to sleep. Needless to say, if consciousness required such high-order, reflective, and adult-like features, we would certainly agree that the fetus is in no sense conscious. However, phenomenologists have defended the view that consciousness is primarily pre-reflective (Gallagher & Zahavi, 2012) and the usefulness of a minimal, "off-line" notion of consciousness is recognized also in science (Brusseau, 2008). Thus, Lagergrantz's arguments rely on a restricted notion of consciousness that I do not take to be valid from a phenomenological point of view. Moreover, I think his arguments are not conclusive. First, it is easily granted that the intrauterine environment does not favor wakefulness and that neuroinhibitors help keep the fetus quiet. Yet it is difficult to evaluate the impact of chemicals on the fetus's lived experience, also in consideration of the fact that not all of them have an inhibitory function—see the excitatory role of the important neurotransmitter GABA (Lagergrantz, 2014). Consequently, I consider the frequency and complexity of fetal behavior, together with the "high activity" of its brain, to be better indicators of its lived experience. Second, it is not true that the fetus is always asleep. At 36 weeks four behavioral states can be identified, which present close similarities to four respective neonatal states: quiescence, active (REM) sleep, quiet wakefulness, and active wakefulness (Pillai & James, 1990; Hepper 2015). In the last 4-6 weeks of prenatal development, active sleep is the most common state (occurring 42-48% of the time), but the wake active state is also present (6-9% of the time). Prior to 34-36 weeks, researchers do not talk about behavioral states, but about rest-activity cycles. The latter are not disorganized and appear to be internally regulated (Piontelli, 2015). In the last analysis, the kind of kinesthetic experience I hypothesize to be in place in the fetus is compatible with active sleep from the 36th week. Indeed, *pace* Lagercrantz, I take dreaming to be a clear example of phenomenal experience occurring during sleep. Furthermore, kinesthetic experience may also occur from 30-36 weeks when coordinated, "intentional" behavior takes place accompanied by thalamocortical activity.

dispositions to experiences that can be re-enacted—Husserl's "experiential acquisitions." After birth, the visual experience of modeled acts reawakens through similarity the corresponding kinesthetic dispositions. Hence, if no other motivational states or tendencies determine the neonate otherwise, the imitative act is elicited. It is important to note that the reliance on motor habits is implicit in the very studies of neonatal imitation, as what is called "imitation" is nothing other than a visually induced increase in the execution of specific acts. Thus, one might perhaps argue that the resort to prenatal experience is necessary only to explain the episodes of imitation occurring within the first few hours after birth. In any event, the inquiry into prenatal experience makes a robust case for the presence of established motor abilities at birth.

The discussion of neonatal imitation has a double revelatory function. In the first place, it shows that similarity between the actions of self and others is able to determine behavior from the neonatal stage. This undermines the idea that, because the self is experienced proprioceptively and others are experienced visually, the experience of self and others have no significant elements in common. Secondly, this discussion allows us to explore the motor experience that represents the foundational pole for the perceptual transfer occurring in pairing. Starting very early in development, this motor experience builds up the "reservoir of meaning" (Zahavi, 2014, p. 133) by means of which, somewhat after the newborn period, the infant may start interpreting the behavior of others as expressive of mental content.

2.2. A period of non-intersubjective experience

Before we address the infant's experience of others as minded beings, we should make sure we do not neglect what comes prior to it in the order of development. In this

subsection, I propose the hypothesis that infants do not generally experience others as minded beings in the first two months of postnatal life. During these two months, one can observe the presence of important preconditions for the experience of others as endowed with mental states, but such experience does not take place. In the next section, I argue that the earliest episodes of mental state attribution occur between the third and the ninth month.

The assumption that the first two months are free from the experience of others as minded beings is supported by a number of estimates concerning the inception of this kind of experience. Stern (1985) fixes it between the seventh and the ninth month, Rochat and Striano (1999) around the seventh month, and Tomasello et al. (2005) around the ninth month. These estimates are made from within descriptions of the development of social-cognitive abilities. For example, Rochat and Striano (1999) claim that newborns up to 6 weeks are substantially "externalized fetuses" (p. 13) and between 2 and 6 months they develop expectations about how others interact with them; only subsequently do they attribute intentions and motivations to others. Tomasello et al. (2005) propose that up to the age of nine months infants can learn what others typically do and discriminate animate vs. inanimate beings, i.e., beings capable vs. incapable of spontaneous self-movement; yet they do not yet ascribe goals to animate beings. However, Tomasello (2008) indicates the possibility that infants understand others' goals at six months, and Astington and Hughes (2013)—in a review suggesting that goal-attribution is the earliest kind of mental state attribution—reports detection of goals as early as 5 months of age.

Despite some differences, all these studies point to the inception of the experience of others as minded beings as occurring after the first two months.[13]

Nonetheless, inspired by Trevarthen (1979), various contributors have claimed that mental state attribution already starts before 2 months. This claim does not fit well with the theory of pairing. If mental state attribution occurred at such an early stage, it would be difficult to argue that it occurred through association with one's own behavior. It would be more natural to suppose that infants have an innate module allowing them to directly intuit others' mental states. For example, infants at this age have never grasped an object (up to this point there is only what is called "pre-reaching"). How could association with one's own behavior explain the apprehension of someone else's grasping as goal-directed? Association by similarity can indeed explain how the repeated occurrence of a kind of visual stimulus reawakens a motor habit. This is what happens in neonatal imitation according to the hypothesis discussed in the previous subsection. Yet this kind of priming is passive and relies on the background of a motor activity the infant already executes spontaneously. Is the apprehension of a facial gesture as expressive of emotion explainable in the same way? This apprehension would be a novel cognitive operation, not a mere elicitation of what has already taken place. If this kind of apprehension were proved to occur in the first two months, we would probably feel inclined to think it is due to an innate module for mental state attribution. Though in various forms, at present there is a widespread tendency to assume that early manifestations of the experience of the mental aspect of others can be explained only by

[13] The idea that infants do not attribute goals or intentions for the first two months fits well with the claim that infants do not compute others' *beliefs* at 7 or 15 months of age (Fenici, 2015).

resorting to pre-programmed cognitive systems evolved specifically for social-cognitive functions (Baron-Cohen, 1995; Carruthers, 2013; Csibra, 2010; Leslie, 1994).

A nativist model of mental state attribution stands in opposition to the theory of paring. It is helpful to represent the contrast between the two in connectionist terms. The contrast concerns the source of the connections between units representing the spatiotemporal, kinematic features of movement—these are units activated through sensory modalities (including proprioception)—and the entire set of units representing behavior—these units represent a totality including movement and the mental aspect of behavior. Indeed, if we opt for a view according to which behavior, or, action, is necessarily impregnated with mental content, there is still the problem of how the representation of movement through space may become a representation of an action. A hand grasping a toy is not necessarily apprehended as a grasping; rather, it might be experienced as a movement of something that ends up occluding another object. This distinction between mere movement and goal-directed action is key to most studies of the development of action understanding (Filippi & Woodward, 2015; Rochat & Striano, 1999; Tomasello et al., 2005). Accordingly, the difference between paring and innate mental state attribution boils down to how the representation of others' movements results in a representation of others' action. The theory of pairing supposes the connections between movement and action are strengthened through the experience of one's own action, so that, when similar movements are presented, an integral representation of action is activated. Differently, the nativist view supposes that the movement-action connections are a "wired up" feature of the system or mature at a certain stage according to genetic instructions, in part independently of one's motor

activity. When the relevant representations of movement are activated in the perception of the other, the innate link generates a representation of action.

If mental state attribution starts in the first two months after birth, nativism gains considerable plausibility at the expense of pairing. Hence, in this subsection, I challenge the main arguments for such an early onset of the experience of others as minded beings. However, my own argument will be completed only when I present a positive picture of infant-caregiver interaction as the privileged locus for pairing (subsection 3.2). According to this picture, interaction does not presuppose mental state attribution, but has a crucial role in bringing it about. Thus, I do underline the importance of factors that facilitate interaction. Although these factors are not sufficient for mental state attribution, they give a critical contribution by setting interaction into motion.

As an incisive summary of the arguments for mental state attribution before two months, consider the following passage from Zahavi and Rochat (2015, p. 547):

> By 6 weeks, if not earlier, infants are already sensitive to (1) eye gaze, (2) 'motherese', and (3) turn-taking contingency. As Csibra has argued, this shows that they are able to recognize that they are being addressed by someone else's communicative intentions long before they are able to specify what those intentions are(Csibra, 2010)

Following Csibra, they estimate that the capacity to attribute a communicative intention is present by 6 weeks. It might be argued that there is not a big difference between 6 and 8 weeks, and so Zahavi and Rochat's assessment does not significantly contradict my hypothesis. Indeed, more than questioning their timescale, I think it is important to raise

some doubts about the three elements they take to be probable indicators of mental state attribution.

First, the finding that neonates not only preferentially look at human eyes, but are also sensitive to the direction of their movements (Farroni et al., 2004) might tempt one to think neonates experience others as seeing. This temptation is easily dispelled. Brooks and Meltzoff (2014) explain that, most likely, infants are drawn to direct their gaze according to the direction of the perceived motion—they call this "motion following" (p. 172). In fact, the artificial displacement of the whole face while eyes remain still obtains the same effect. Moreover, there is evidence that infants start tracking the gaze of other people around the ninth month, probably after they learn that adults tend to act on the objects toward which they turn their head and eyes (Brooks & Meltzoff, 2014; Fenici, 2015). Yet we should not downplay the innate preference for human eyes (and faces), as it is a main factor in promoting infant-caregiver interaction. Also the fact that before nine months, infants can be pulled into viewing the same object as the adult by the adult's head turn likely facilitates interaction. Similarly, the innate preference for the features of motions typically exhibited by biological beings helps support the interaction with beings of this kind, although its early manifestation does not entail mental state attribution (Simion, Bardi, Mascalzoni, & Regolin, 2013).

Second, Csibra (2010) accepts that infants show a preference for the mother's voice and for the typical way in which mothers address infants, i.e. what is called "motherese." He accepts that the function of infants' responses is to make adults repeat the sounds and prolong the interaction. However, he also adds infants grasp the adults' intention to communicate. The latter addition is not necessary because all the findings he

points to are explained by the positive emotions evoked in infants. For example, when the newborns' tendencies to prefer their mother's voice and motherese "are pitted against each other, the more familiar adult-directed prosody of the mother wins out over her motherese" (Csibra, 2010, p. 148). Infants have had up to four months to familiarize with their mother's voice before birth (Astington & Hughes, 2013); in subsequent development, as motherese becomes more familiar and its aesthetic value becomes even more appreciated, infants prefer when their mother is talking in motherese (Csibra, 2010). An explanation that resorts only to positive emotions is more parsimonious than one that resorts to positive emotions and mental state attribution. Thus, the former seems to be preferable.

Third, Csibra (2010) describes infant-caregiver interaction as being most characteristic between 2 and 6 months and as resembling conversational turn taking. He claims that, from the very start, infants experience the contingent character of adults' responses as a signal of a communicative intention. However, there is no reason to suppose this really occurs in the initial stages. What the findings show is simply that infants prefer contingent responses to responses that are not related to the timing and the tone of their own actions. Indeed, young infants rapidly learn to expect contingent responses (Astington & Hughes, 2013). It is likely that infants experience pleasure from the earliest interactions and that the disposition to undergo positive emotions in these contexts is innate (Fiebich, Gallagher, & Hutto, in press). This innate disposition may be seen as the spark that sets the interaction into motion and as a continuous engine behind it. I emphasize that pairing is not opposed to nativism in general, but only to the kind of

nativism that conceives of mental state attribution as a pre-programmed operation relative to a certain kind of stimuli.

If the considerations proposed in this section are correct, human beings live a period of non-intersubjective experience from two months before birth to two months after birth. Such experience is non-intersubjective in the sense that no mental states are attributed to other beings.[14] However, this period lays down crucial precondition for the experience of others as minded beings. On the one hand, the infant increasingly explores its action possibilities and expands its own body schema. On the other hand, the infant becomes familiar with a variety of perceptual features relative to other people. For instance, we may suppose that the voice and the face of the mother come to stand out as perceptual unities in the sensory experience of the young infant.[15] Furthermore, during the first two months one can already observe the early manifestations of the innate tendencies that support infant-caregiver interaction. In the next section, I propose that the earliest episodes of mental state attribution occur between the third and the ninth month through pairing.

3. Pairing in Infancy

It is generally accepted that at around nine months infants experience others as minded beings (Astington & Hughes, 2013; Rochat & Striano, 1999). At this age, infants engage triadic self-other-object interactions, which include joint attention. If pairing accounts for

[14] As other phenomenologists do, I use the term "intersubjectivity" for a kind of experience that entails mental state attribution, i.e. the experience of others as minded beings. However, I do not equate "intersubjectivity" or "mental state attribution" with social cognition. Intersubjectivity and mental state attribution are eminent phenomena of social cognition, but do not exhaust it. Social cognition is a broader field.

[15] For this stage, Husserl talks of the mother as a mere "visual and tactile unity" (1973c, p. 605).

how infants come to attribute mental state, then it must occur by this age. Therefore, in the present section, I focus on the period between the third and the ninth month. Yet I also discuss findings that extend into the first 18 months in order to suggest that the basic kind of mental state attribution occurring through pairing is a stable phenomenon throughout infancy.

Subsection 3.1 discusses studies of how infants perceive the action of others. These studies allow us to indicate points of development at which the attribution of mental states occurs. However, these studies refer to artificial experimental situations, so they are not sufficient to give us a complete picture. On the other side, by examining infant-caregiver interaction, subsection 3.2 addresses the problem of how mental state attribution may come about in the real life of the infant. Yet subsection 3.2 does not indicate any precise point in time for the occurrence of pairing. It simply makes the case that pairing probably occurs before nine months.

3.1. Pairing and action

Recall that pairing includes a transfer from the experience of self to the experience of others. In infants, what is it in the experience of self that gets transferred to others? Consider Tomasello's (1999) accurate description of what one experiences in oneself when acting:

> As I act I have available the internal experience of a goal and of striving for a goal, as well as various forms of proprioception (correlated with exteroception) of my behavior as I act toward the goal. (p. 70)

What is experienced in oneself can be expressed in many equivalent ways: striving for a goal, "intending" a goal, body intentionality, goal-directed behavior. All the findings I

review in this subsection serve to make the same point: the infant can perceive the intentionality expressed by the other's actions insofar as it has developed and experienced in itself a similar body intentionality. In my interpretation, the findings show that the infant begins to perceive the movements of others no longer as mere variations of the positions of items in space, but in terms of the experience it has of its own bodily goal-directedness. The order of the review follows the infant's development up to 18 months.

The youngest age at which it has been possible to detect sensitivity to the goal-directed structure of another's action is 3 months (Sommerville, Woodward, & Needham, 2005). The features of the experiment allow us to talk about an *initial* perception of the lived intentionality expressed by the others' actions. Two groups of infants took part in a habituation procedure in which they had to watch a person grasping either a teddy bear or a ball. Before the habituation procedure, children of one group were allowed to interact with these objects with the help of a pair of special white "magnetic" mittens, with which they could easily pick up the objects by swiping or batting at them. The children of this group (the infants in the "reach-first" condition) looked longer at the grasping executed by another person. Thus, compared to the infants who had not practiced the action, perceived movements had assumed an additional meaning. This meaning entailed a reference to the actions already performed.

After the habituation procedure, the positions of the toys were switched and children watched either a grasping of the same object of the habituation procedure—but in a different position—or a grasping of a different object—but in the usual position. The infants in the reach-first condition looked longer at the grasping of the new object whereas the other infants looked at both events equally, showing no particular interest in

a change of goal with respect to a change in trajectory. Only infants with first-personal experience could capture the difference in the goal-directed structure of the other's action. It is reasonable to suppose that the reason for this is that only experienced infants tended to perceive the other's grasping as grasping, i.e. as intending a goal, and not merely as a movement that ends up partially covering another object. Infants started becoming aware of something in the movements of others that they had experienced first-personally in their own bodily activity: goal-directedness.

If one is skeptical toward the phenomenological-psychological approach, it is possible to rephrase my interpretation independently of the consideration of lived experience. Then, the difference between the two groups of infants is explained by the hypothesis that the brain of experienced infants is able to process the goal-directedness of the movements of others through the similarity with executed actions.

The transfer of goal-directedness is founded on the experience of common traits in the actions of others and the self. Let us then spell out what these traits may be in Sommerville et al. (2005): the use of the same toys as "goals," the comparable kinematics of the movements, the presence of white mittens (the experimenter grasping the toys also wore them), and perhaps the visual aspects of hands and arms. Noticeably, detailed analysis showed that the extent to which reach-first infants had engaged themselves in organized, intentional activity made them sensitive to the other's intentional action more than perceptual highlighting or individual differences in motor development.

In my interpretation (however we want to phrase it), this experiment is a direct attack on a nativist view of mental state attribution. Prior findings had shown that at three months infants "do not spontaneously encode the goal-directed structure of another

persons' reach and grasp" (Sommerville et al., 2005, p. B3). Thus, it is the artificial intervention of letting infants practice with the white mittens that produces the sensitivity to the goal-directed structure of the other's actions. It would be clearly *ad hoc* to postulate that here practice is a mere occasion for the maturation of a pre-programmed module that links visual stimuli to behavior representation. It seems that the only credible kind of explanation has to assign a causal role to the transfer through similarity from one's own behavior.

After having practiced grasping in their natural, impulse-driven development, by five months infants tend to construe grasping as goal-directed (Woodward, 1999). This ability is further developed in the following months. 6 and 9-month-old infants looked at the grasping of a new object longer than at a grasping following merely a new kinematics only if the grasping was executed by a person, not if it was executed by a claw (Woodward, 1998). Thus, infants were facilitated in perceiving the goal-relatedness of an action by the fact that the general look of the agent, or its way of acting, was familiar to them and similar to their own. This points to the formation, in early human development, of what Husserl (1973c, p. 183) called a "typical corporeity:" by acquiring more and more experience of self and others, infants learn to perceive certain sorts of things (i.e. the things that in certain ways look human) as minded beings or to expect them to be so.

The impact of action production on action perception was demonstrated with infants from 7–13 months (Hauf et al., 2007; Hauf & Power, 2011). Investigations on 10-month-old infants' looking times revealed that infants who are able to organize for themselves a goal-related and hierarchically structured motor act are more sensitive to the goal of that action sequence when performed by others (Sommerville & Woodward,

2005). Active training alone—not simply observation—enhanced 10-month-olds' ability to identify the goal of an action employing a tool (Sommerville et al., 2008).

Like adults, 12-month-old infants present predictive goal-directed eye movements when observing a goal-directed placing performed by others. Yet, at 6 months of age, before the period in which this kind of action begins to be mastered (7–9 months), infants shifted their gaze to the goal only when the other's hand had already arrived. Such a result suggests that infants become conscious of the intentionality of the other's action only after they develop a first-person experience of that intentional action. Furthermore, intentionality is perceived only if embodied in a familiar human body: both in adults and in 12-month-old infants, predictive eye movements are not activated when they observe self-propelled objects following a goal-directed trajectory without the presence of human effectors (Falck-Ytter et al., 2006; see also Cannon et al., 2011).

It is true, however, that 12-month-old infants seem to understand the intentionality implied in the movements of objects that look very different from human beings. Gergely et al. (1995) habituated infants to seeing a small circle approaching a large circle by jumping over an obstacle separating the two. When the obstacle was removed and the circle, to approach the target, followed the same trajectory as before, infants looked longer at this "behavior" than at the one following a straight-line: they were expecting the circle to follow the most efficient trajectory. Although these visual dissimilarities may appear to call into question the necessity of an association with the experienced body of the infant, we should observe that the abstract figures involved do conform their behavior to that of the infant's body or other experienced human bodies when they want to reach something. Indeed, the similarity grounding the perception of the other's intentionality

doesn't have to be about specific appearance; it is rather a similarity of movement—something that registers with the body schema. This "embodied" interpretation of Gergely et al.'s finding is further supported by two considerations. First, the finding could not be replicated at the age of 6 months (Csibra et al., 1999), i.e,. before the onset of self-locomotion with crawling at approximately 8 months (Hauf & Power, 2011). Second, infants learn to perceive the intentionality of an inanimate object through experience (Hofer, Hauf, & Aschersleben, 2005).

In studies reported by Meltzoff (2005), 12- to 18-month olds observed adults turning their head towards a target. When adults had the eyes open, infants looked at the target significantly longer than when adults had the eyes closed. As Meltzoff remarks, infants have experienced in themselves that having the eyes open makes visual perception possible whereas closing the eyes cuts it off. It is plausible that when the child sees the adult turning the head with open eyes an association occurs with the kind of movement the child itself performs in turning the head to see; the infant is then able to perceive the adult as looking at something. Analogously, the infant may understand the adult's closed eyes in terms of the experience it has of having the eyes closed. Interestingly, when a blindfold was put on the adult to block her perception, infants looked at the target as if the adult were looking at it. If, however, the blindfold was previously put on the infants and they could experience that a blindfold blocks sight, they did not turn to look at the target.

In another experimental situation (Meltzoff, 2005), 18-month-olds were presented with an adult who repeatedly attempted to take apart an object, but whose hands always slipped off. After observing the scene, infants successfully performed the action the adult

wanted to perform, demonstrating they had understood the adult's intention. Convincingly, Meltzoff argues that infants have already experienced strivings, successes and failures in their own actions, thus they perceive the same intentions in the other when she acts in a similar manner. The fact that, when the same unsuccessful attempts were displayed by a mechanical device, infants did not try to perform the action may strengthen the idea that infants selectively ascribe real intentions to bodies that have the familiar look of minded beings.

To date, there is an impressive amount of behavioral and neurological evidence that action production influences action perception in infancy (see the extensive review by Fenici, 2015; Filippi & Woodard, 2015; Krogh-Jespersen, Filippi, & Woodward, 2014). This evidence supports the hypothesis proposed for the findings discussed in this subsection: the comprehension of the action-intentionality of others entails a transfer from the experience of one's own goal-directed behavior. Note that I interpret "looking" as an action involving eye and head movements. Thus, the apprehension of another as looking implies a transfer not dissimilar from the apprehension of a grasping as grasping.

Evidently, my hypothesis is consistent with the presence of a neural mirror system in infants. In particular, my hypothesis entails a specific model of the development of the mirror system, i.e,. a model of how motor neurons become mirror. Because the articulation of this model would take us too far afield—as it cannot be assimilated to standard views—I will discuss it in another chapter.

3.2. Pairing and interaction

We still need a more complete and realistic idea of how pairing may be the process by which infants come to experience others as minded beings. For this purpose, in this last

subsection, we have to abandon the artificial—though very instructive—experimental settings of the previous subsection and dive into the concrete social life of the infant, which is characterized by interaction with its caregivers (Gallagher, 2005).

"Proto-conversations," i.e. affectively charged intercourses involving gestures and vocalizations, are the most representative example of mother-infant interaction. It has been shown that infants are sensitive to adults' responsiveness in these interactions beginning at two months. In Murray and Trevarthen (1985), infants happily interacted with mothers through a two-way, live video monitor; then a recording of their mothers' previous actions was shown and the infants disengaged the interaction becoming distracted and upset; thus, the very same gestures and vocalizations that had made infants happy minutes earlier made them wary once these gestures were no longer responsive to them, i.e., contingent on their own expressions.

Social interaction is a unique kind of interaction for the infant. The other's gestures are not merely causal effects as they do not occur in predictable ways, e.g., like rattles that produce a louder sound in proportion to the force employed by the infant. The other's gestures are not only responses, but incitements, attempts at soothing or arousing, initiations of new interactions, alternations of high and low intensity, etc. What do babies like in such interactions? As shown by Murray and Trevarthen (1985), it's not simply pleasant vocalizations and gestures, it is the dynamics of the interaction itself that babies like; a baby enjoys that a kind of music is created in which each partner has its turn and a sense of when to intervene (cf. Reddy, 2008, p. 74).

I hypothesize that the common traits that the infant experiences in its own behavior and in the behaviors of others during interaction are the ground for the transfer of low-level mental states. I identify three main kinds of similarities:

1) Both self and other contribute to the interactive process: they both keep it going, they cooperate in making it and in maintaining or varying its affective tone. As Zahavi and Rochat (2015) put it, "self and other are engaged together in an open-ended, emotional bid building process" (p. 548) This *being-together in the interaction*—i.e., the fact that both self and other are there in such a unique intercourse and play comparable roles—is probably the most powerful element of similarity.

2) The rhythms and kinematics of gestures perceived in others are similar to those proprioceptively experienced. If my analysis of neonatal imitation is correct, this similarity is already functioning in the neonatal period. Consider also "affect attunement" (see below).

3) Compared to most sounds generated in the environment, the others' voices appear to be similar to the infant's vocalizations. Granting that the production of the infant's own vocalizations is always accompanied by felt kinesthesia and affects, it is not hard to see how the other's vocalizations might become associated with lived experiences (cf. Husserl, 1973c, p. 606). If one adds that parents imitate the particular vocalizations of the infant (Kokkinaki & Kugiumutzakis, 2000), vocalizing emerges as a non-negligible factor of pairing.

To be clear, the being-together of self and other in the interaction does not presuppose some minimal grasp of the mindedness of the other. By two months, infants are pulled in the interaction with the other and so happen to experience the being-together of self and others. This simply means that infants experience self and others as moving and vocalizing in similar ways and as sustaining the same interaction. This experience does not presuppose low-level mental state attribution, but, rather, generates it.[16]

With regard to the foundations of pairing it is not important who initiates the "resonance" (Fuchs & De Jeager, 2009). If I resonate the other by responding with a similar behavior, the future behavior of the other will resonate my newly acquired behavior. Nonetheless, psychologists suggest that caregivers repeat the actions of infants or their style more than vice versa: caregivers imitate. According to Ray and Heyes (2011), the developmental environment provides plenty of situations in which when the infant does x, it also experiences the caregiver doing x (and not y) as contiguous to its action. For a sense of how substantial parental imitation might be, consider this description of real-life interaction from Jones and Yoshida (2011):

> In early sessions [starting at three months], Yo's mother frequently imitated Yo's vocalizations, facial expressions, and head movements. In the first session, Yo's mother imitated Yo thirty times in 9 minutes […]. Nineteen of these were imitations of sounds the baby made; eleven were instances of actions – tilting the head, raising eyebrows, facial expressions, and touching the face with a hand. At that rate, assuming something like 1-2 cumulative hours of interaction with

[16] As Stern (2010, p. 107) puts it, "parents are a 'sound-light show' for the baby, a spectacle to play upon their states of arousal." The spectacle is contingent to the baby's own behavior and is emotionally significant, but, in the early stage, is simply a "sound-light show."

> parents and other social partners each day, Yo could have experienced from 200 to 400 instances of imitation of her own sounds and actions in a single day. In 1 month, she could have experienced 6,000 to 12,000 instances; in 6 months, 36,000 to 72,000 instances. (p. 216)

Importantly, infants are not indifferent to the similarities experienced in the actions of others. At two months, they already show signs of sensitivity to being imitated (Nadel, Revel, Andry, & Gaussier, 2004). The significance of maternal "affective mirroring" can also be evinced by the finding that infants exposed to low levels of affective mirroring show reduced ability to coordinate attention with another at 5 and 10 months (Legerstee, 2005).

If pairing occurs in the interaction, what kinds of lived experiences come to be attributed? I suggest that the lived experiences that are transferred are the same ones that are undergone by the infant in the interaction. These are affects, or emotions, and probably the kind of communicative intentions discussed by Csibra (2010). However, I would describe them more as "intentions to play" than as "intentions to communicate," because it seems plausible that the infant may see in the other the same playful intention to interact that it experiences in itself. As for affects, the idea is that since the other embodies traits similar to the ones the infant embodies when it lives through an affect, it apprehends her as sharing the same affective tone. Again, no inference from analogy is in play, but merely the natural course of perception, which—if particular features of the stimuli do not oppose it—apprehends new stimuli in terms of past or present experience.[17]

[17] This account fits well with Newen, Welpingus, and Juckel's (2015) account of emotion recognition, which postulates it to rely on the same kind of pattern recognition in place for object perception. According

One way in which pairing occurs is through the phenomenon Stern (1985) incisively described under the name of "affect attunement." The mother's affectively attuned behaviors are characterized by a cross-modal matching where what is matched is some aspect of the infant's behavior that reflects its affective state: intensity, timing, and shape. Stern gave vivid descriptions of this phenomenon around the 9th month, yet today's psychologists attest its presence at least from the age of 3 months (Reddy, 2008). Let's take happy attunement as an example and ask how infants come to perceive certain expressions as expressing happiness. We can sketch a process of the following kind.

At about 8 weeks the infant responds with a smile to the adult's smile; the infant smiles back simply because it likes the smile. Yet, the adult is galvanized and offers her smiles again and again, while the infant starts having fun in the process. One day the infant produces an almost imperceptible laugh, the adult responds by laughing heavily, and the infant increases its laugh; as the interaction continues, the infant has fun and is happy. The infant starts laughing on other occasions; in these occasions people laugh too, reinforcing the laugh of the infant (scaffolding). Can we identify similarities that might ground pairing? Roles played, gestural kinematics, intensities, rhythms, timings, the tone of gestures and vocalizations are comparable and all happiness-inducing. Thus, the infant experiences another being that is in all ways similar to itself when it's happy; then the infant will tend to see in the other the same it experiences in itself, i.e. will see happiness in her face.

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to these authors, an emotion is a pattern of characteristic features. Even if I do not experience the phenomenal character of the others' emotion, I can still attribute to her such phenomenal character when I recognize the emotion. This recognition may be made possible by the presence of the same physical characteristics that I experience in myself when I undergo the emotion.

I grant to Reddy (2008) that infants attribute emotions by nine months because by that time the infant has experienced substantial commonalities in self and others through interaction. However, I do not endorse her view that the first social smiles (infant smiles back to adult's smile) or the first affective interactions are indicators of mental state attribution. The child's initial behavior is more parsimoniously explained in terms of innate preferences and a predisposition to interact with something in various degrees stimulating, enthralling and welcoming. There is also another reason to be cautious about early emotion attribution. Prior to learning specific emotion words around 2 or 3 years of age, infants can reliably discriminate emotions only in terms of general valence (i.e. happy vs. sad); they cannot differentiate between more specific emotion categories (Lindquist, MacCormack, & Shablack, 2015). Thus, the way infants initially ascribe emotions is probably rough.

It is difficult to be more precise as to when exactly emotion attribution takes place. There are probably significant individual differences between infants. A more defined timeline would require not only some ingenious experiment, but also accurate descriptions deriving from a second person approach of the kind Reddy (2008) pursues. In general, pairing may be gradual or may be characterized by periods of preparation followed by relatively sudden global transfers. Indeed, for Merleau-Ponty (1964b), pairing takes place as a Gestalt restructuration of experience. The experience of the infant's own (inter)-acting body creates an imbalance, which—as it is increasingly echoed in the experience of the other—is finally followed by a rapid reconfiguration of the interaction as a system of two minded beings reciprocating with each other.

The account proposed in this subsection is greatly indebted to Interaction Theory (Gallagher, 2005). As applied to early social cognition, this model emphasizes the role of sensorimotor capacities for interaction for the acquisition of socio-cognitive skills that allow infants to understand others' mental states (Fiebich, Gallagher, and Hutto, in press). Yet Interaction Theory is neutral with respect to whether pairing or an innate module is ultimately responsible for the earliest experiences of the other as a minded being. I argue that pairing is more faithful to the spirit of Interaction Theory than a nativist view of mental state attribution. A nativist view tends to interpret infant-caregiver interaction as entailing mental state attribution from the very beginning. In contrast, although I grant that at a certain stage particular features of the interaction might be taken as indicators of mental state attribution, I claim early interactions do not presuppose mental state attribution, but rather contribute to bring it about.

It is true that advocates of Interaction Theory say sometimes that dyadic relations "*presuppose* sensitivity towards embodied emotions" (Fiebich, Gallagher, & Hutto, in press; emphasis mine). However, sensitivity to embodied emotion can be understood in a very general sense, i.e. simply as the idea that different embodied emotions of others provoke different kinds of responses in the infant. Indeed, Trevarthen's (1979, p. 322) original definition of primary intersubjectivity merely requires that infants "be able to adapt or fit this [their] subjective control [of actions] to the subjectivity of others." This definition, which was substantially adopted by Interaction Theory, can certainly be applied to interactions where the other is not yet experienced as a minded being. When the infant, who fixes the mother's eyes as if it were captured by them, smiles back at her smile, it "adapts or fits" its behavior to the emotion embodied by the mother. Yet, at least

in the very first stage, it may not perceive an emotion "in" those movements that it finds so agreeable.

A nativist view would assign to interaction a merely *enabling* function. To clarify this, recall that I have equated mental state attribution to the apprehension of perceptual stimuli in terms of action, because, according to the conception I have endorsed, action, or, behavior, entails mental content. At best, then, interaction would provide the necessary ingredients, i.e., perceptual stimuli coming from the other and the experience of behavior in oneself. However, the decisive connection between perceptual stimuli and behavior would be operated by a pre-programmed link that matures when all preconditions are in place. Therefore, to the extent that Interaction Theory seeks to assign a more robust causal role to interaction, pairing is a preferable model. Pairing is a dynamic reorganization of the contents of experience occurring in virtue of their intrinsic properties. From the point of view of pairing, interaction does not only provide the relevant contents of experience, the experience of self and of others with their common elements (vocalizations, kinematics, etc.). It also adds a factor of similarity that could not possibly be realized otherwise: the being together of self and other, i.e. the presence of both in a unique exchange and the comparable roles played in it. Assuming that assimilation is always ready to function, interaction provides then all that is needed for a reconfiguration to occur where mental states are attributed to others. No need for a modular system as *deus ex machina*!

Before I move to my concluding remarks, it is opportune to clarify how the notion of intersubjectivity I used in this chapter relates to the notions of primary intersubjectivity and secondary intersubjectivity. The notion I used is a phenomenological notion that

requires the experience of the other as a minded being. More specifically, it refers to low-level mental state attribution, i.e., the experience of the other's bodily intentions, emotions, or perceptions. In contrast, a great number of psychologists and theorists who talk about primary intersubjectivity do not require this kind of intersubjectivity to imply low-level mental state attribution. The phenomenon they capture with the expression "primary intersubjectivity" is a kind of infant-caregiver interaction in which the behavior of the two partners is regulated by the mental states of the other (especially the other's affective states). An infant can produce appropriate responses to the embodied emotions and the actions of the mother without attributing emotion or action-intentions to her.

As Fiebich, Gallagher, and Hutto's review (in press) specifies, primary intersubjectivity starts soon after birth, whereas secondary intersubjectivity, which requires complex triadic interaction such as joint attention, begins typically after the ninth month. In subsection 2.2, I argued that the hypothesis that primary intersubjectivity is accompanied by mental state attribution from birth is not correct. It is more probable to suppose that infants do not attribute mental states to other in the first two months of life. In subsection 3.1 and 3.2, I provided evidence to support the hypothesis that low-level mental state attribution begins to occur between the third month and the ninth month. With regard to bodily intentions, the earliest episode of attribution is detected at three months (Sommerville & Woodward, 2005). With regard to emotion, I admitted that this chapter does not specify when exactly the earliest episode of mental state attribution may occur. Yet I argued that we have reasons to believe that emotion attribution occurs before the establishment of secondary intersubjectivity.

As a consequence, the onset of the kind of intersubjectivity defined by the phenomenological idea of experiencing the other as a minded being—this idea requires low-level mental state attribution but does not require specific kinds of triadic interaction like join attention—must be situated between the onsets of primary intersubjectivity and secondary intersubjectivity. The developmental findings reviewed in this chapter suggest that the notions of primary and secondary intersubjectivity are not fine-grained enough to account for the onset of low-level mental state attribution.[18] There is a period of primary intersubjectivity without low-level mental state attribution, but low-level mental state attribution arises before secondary intersubjectivity.

Conclusion

To recapitulate, pairing is a perceptual process that implies a transfer, just as any other ordinary perception (Section 1). Transfers from past or other present experiences occur in virtue of the similarity with the experiences instantiating the transfers. Yet, in the case of pairing, the content of the transfer includes "lived experiences" or "mental states." For this reason, pairing functions as a process for attributing mental states to others. This is the principal aspect of pairing I develop in this chapter. Nevertheless, the way in which the similarities engendering mental state attribution are experienced—i.e. self and others are both active participants in an environmentally situated, interactive system—hints at another aspect of pairing that contributes to social cognition. Pairing points to the generation of a we-system: *we* grasp these toys, *we* look at these objects, *we* enjoy this interaction, etc. Evidently, the experience of self is radically modified when the self is experienced as a member of a system of minded beings. Thus, the focus on how a subject

[18] Among others, this consideration is clearly supported by Tomasello (2008) and Astington and Hughes (2013).

comes to experience others as minded beings should not make one think that it is an isolated topic. On the contrary, mental state attribution is connected to the constitution of shared intentionality and the development of self, although these topics are beyond the scope of this chapter.

I examine the earliest episodes of mental state attribution in development (Section 3). An infant comes to experience others as minded beings by attributing to them bodily intentions, emotions, and perceptions. In all probability, the consistent attribution of these mental states indicates that the infant has an overall sense of the other's body as a minded body, i.e. as a body lived from within. In subsection 3.1, I show that a transfer through similarity with the infant's own behavior explains the attribution of bodily intentions from its earliest detection at 3 months. I also point to signs that the same kind of transfer is involved in the ascription of visual perception. In subsection 3.2, I argue that paring likely occurs in infant-caregiver interaction between the third and the ninth month, before the time at which it is widely agreed that infants experience others as minded beings. The affective character of the interaction allows for the attribution of emotions. I conclude that pairing accounts for the earliest episodes of mental state attribution. This conclusion is corroborated by the discussion of the preconditions of pairing in the order of development (Section 2). Starting in prenatal life, subjects experience their own motor activity. Association by similarity between one's own and the other's movements may occur in the neonatal period, as demonstrated by early imitation. Although pairing does not occur at this stage, the preliminaries for its occurrence are progressively laid down and interaction is set into motion.

The method of my interdisciplinary inquiry pulls together phenomenology and cognitive science. Phenomenologists may read the present chapter as an investigation of the infant's lived experience, cognitive scientists and philosophers of mind as an investigation of its cognitive processes. A result of this interdisciplinary study is particularly evident. While the main traditional theories of social cognition do not seem to provide a credible account of the infant's phenomenal experience, the theory of pairing does. Phenomenologically speaking, infants do not think like scientists who infer hidden mental causes (Theory Theory). Nor do they put themselves in the other's mental shoes by imagining what they would feel if they were in the other's situation (Simulation Theory). These operations require reflective capacities to be executed consciously. In contrast, the idea that infants have an intuitive sense of the subjectivity expressed in the actions of others is credible. It is credible that such intuition tacitly combines motor and perceptual experiences in accordance with the basic associative principle of similarity. It must be acknowledged, however, that Simulation Theory is on the right path when it emphasizes the role of previous self-experience. Indeed, if simulation theorists are ready to accept that in mental state attribution nothing is really "simulated," but, to the contrary, mental states are *posited* thanks to a transfer of the same kind as the one through which non-sensorially given features of objects are posited in ordinary perception, then I would be happy to concede that their theory does not significantly differ from pairing.

The real contraposition is between pairing and nativist views of mental state attribution (Baron-Cohen, 1995; Carruthers, 2013; Csibra, 2010; Leslie, 1994). In their various forms, they all postulate the existence of pre-programmed links that serve to interpret the perceptual stimuli relative to the actions of others in terms of mental

contents. After having considered the arguments for pairing, can we exclude this alternative? Certainly not. It is possible that pairing operates together with an innate modular system. I encourage experimental psychologists to excogitate ways to falsify the assumption that pairing accounts for *all* basic episodes of mental state attribution in early infancy. If they can prove that a basic episode of mental state attribution occurs independently of an association by similarity with the infant's own behavior or before such association may take place, then the assumption will be falsified. However, at present, the theory of pairing does account for a large variety of findings. It accommodates in a unitary framework phenomena as diverse as newborn imitation, innate preferences and dispositions, action understanding, gaze following, proto-conversation, and affect attunement.[19] This consideration makes me dare to think that the theory may indeed be a sufficient account of early mental state attribution. For the time being, if the present chapter is able to spread some caution in front of the easily accepted assumption that mental state attribution early in infancy must be explained through innate mechanisms specifically pre-programmed for this function, I can consider myself satisfied with this result.

[19] Considering the basic character of processes of association by similarity, I predict that a comparable result would be achieved through the study of non-human species.

CONCLUDING REMARKS

Each chapter had its own conclusions. Therefore, I refer the reader to the concluding sections of the three chapters for a recapitulation of their chief arguments. In the conclusion of the entire dissertation, I tie together some of the dissertation's main ideas in three sections. In section (1), I focus on the phenomenological issue cutting across the three chapters. In section (2), I take up questions raised in the introduction and propose answers based on the content of the three chapters. Finally, in section (3), I briefly state the problems left unsolved in this dissertation to which I would like to devote my efforts in the near future.

1. World-less experience

In order to recall the question that cuts across the three chapters, let me, again, state the notion of world with which I operate. The notion of world I employ is not the only notion that is used in philosophical and phenomenological contexts. I can happily accept the idea that, philosophically speaking, it is not the most significant notion. However, I do claim that this notion of world is important because it allows one to tackle the philosophical problems addressed by this dissertation.

The "world" is a core content of "the natural attitude" (Husserl's term for a basic structure of experience that supports practical life, culture and science). This core content is characterized as "the one spatiotemporal actuality to which I belong like all other human beings who are to be found in it and who are related to it as I am" (Husserl 1982, pp. 56-57). The world is the spatiotemporal actuality that is the ultimate context in which every spatiotemporal reality is found. The world is there-for-everyone. Spatiotemporal

actuality and intersubjectivity define the notion of world that appears in the question cutting across the three chapters: “Is an experience that posits no world possible?”

The three chapters of the dissertation entail an affirmative answer to this question. We should now make this answer the focus of our attention. This will allow us to see how each chapter strengthens the others. In order not to be misled by the different methodologies of the three chapters, I emphasize that the question on the possibility of world-less experience can be decided through the method of eidetic variation. Eidetic variation is the method I employ to tackle the question directly. If we can imagine an experience that posits no world and we can imagine it “intuitively,” i.e. in the fullness of its details, then this experience is possible. Remember that I endorse transcendental idealism and that I take the notion of “pure possibility” (as opposed to real possibility) to capture the phenomenon of possibility that is at stake. A real possibility can in theory be actualized, but we do not need to have a reason to expect that it will ever become actual.

Let’s then engage in the imagination of a stream of experience that posits no world. I shall provide enough details to make it imaginable, yet at no point will it be necessary to imagine that the experience of intersubjectivity comes about. I shall use quotation marks to remind the reader that the unities of experience that manifest themselves in the stream are not posited as transcendent realities. The stream will know nothing about other experiencers that relate to the same unities. In imagining such a stream, we have to put ourselves in the shoes of the experiencer who lives it and examine the experience from her perspective. In other words, we have to construct an experience and consider it immanently, as a self-given experience.

Before I start, note that we should imagine the stream as present-focused. In the stream we are going to imagine, there is neither recollection of past experience nor anticipation of future experience beyond what is entailed by the present phase. The present is extended, for it includes the just past and the expectation of what is imminent, as well as a larger, indefinite background of future and past experience. However, there is no act that targets a future or a past experience. The stream targets the present only. This does not mean the past has no effect on the present. The stream can preserve its past even if it is not directed to it and the present can be experienced in light of the past.

Imagine the experience of a "bodily spatiality," a feeling of diffused warmth and fullness, as when one has been nourished and is calm. Imagine the experience of an impulse to move and the experience of fulfilling this impulse by releasing the "movement." The movement is felt from within as discharging a potential that had been accumulating. It has a situation of departure and an end state, a state of arrival. Movement is a temporal unity; it manifests itself by means of a temporal synthesis operated through the interplay between retention, impression, and protention (Husserl, 1991). A movement ends on other surfaces that are felt. As a consequence of the encounter between felt bodily spaces, there are tactile sensations. New warmth is generated on these surfaces. Pressure is exercised on a surface; thus, there is a sense of actively exercising pressure and felt passivity in the area on which pressure is exercised. A sensation of itch solicits a movement. The actual scratching creates a placation of the itch, a pleasant sensation, but also a new "itch" somewhere else… Movement creates and enlarges the experienced spatiality. There is a felt spatiality and a spatiality of potential movement opening itself around the usual organs of movement. One of these movements

encounters external resistance. There is a surface that opposes resistance and at the same time offers itself as a surface to be explored. Another tactile encounter was initially just a factor of discontinuity in a movement; yet it solicits exploration and evokes a specific action. The active "organ" closes around something; "grasping" occurs… All these experiences are extremely transitory; they occur and they elapse forever. That they elapse forever means that they will never be retrieved, but it does not mean that they leave no trace. A past experience may constitute a solicitation to act in a certain way. A past experience of tactile contact evokes a certain movement. The end state that was achieved by chance is now the state guiding the movement. Repetitions induce new repetitions. Repetitions also create rhythms. For example, a series of repeated movements is experienced as a series of "events" across "time."

Imagine that a quality of a specific kind is experienced on a certain surface of the felt bodily spatiality. It is the more or less pleasant quality we designate with the word "taste." Bursts of this quality are integrated in stable patterns of movement and tactile sensation. At other points of the life of the stream, the quality of smell becomes prevalent. There are more or less slight variations in the experience of smell. A sensation of smell has a duration. It also has a location in a more or less defined area in or around the bodily felt spatiality. Imagine that "sounds" are experienced. Again, these are unities of a different quality. They sometimes come in bursts, but there are also periods in which they are relatively continuous. They constitute unities that emerge out of a background of silence or background noise. "Sounds" considerably enlarge the experienced spatiality; they come from different directions. Although we imagine that all these experiences are extremely transitory, we can still imagine that they leave a trace in the stream of

consciousness. Certain sounds are experienced as familiar because they are assimilated to sounds experienced in the past. Other sounds are novel. Perhaps, a habitual familiar sound has a high pitch and a low intensity. A new sound has a low pitch and is very loud. To these different characters correspond different emotional responses.

Imagine that a new sensory field is opened: light. At first it is just an array of suffused sensations, then the stimulus is intense and overwhelming. When the field stabilizes, unities begin to be discriminated from the background. “Movements” are seen. These imply surfaces or lines that vary their position in the field, but also rhythms, which may evoke rhythms previously experienced. “Shapes” and “colors” emerge, stay for a while, and then vanish, perhaps to come back again. Shapes can be vague and the color array can be poor. The field presents nothing more than contrasts between dark and light color. However, a triangular surface looks different from a circular surface. Around a circular light surface, there is a thick dark contour; this contrast is strong and clearly perceivable (relatively to the rest). Inside the light surface, there are irregularities and movements of lines. There is also a pair of dark, thick points next to each other. Their similar quality and their closeness make them appear as a single unity, a pair. All these kinds of experiences are transitory; if they return, they do it without regularity.

Imagine regressions of experience. For example, areas of felt bodily spatiality are no longer available. Where once movements had encountered surfaces on which tactile sensations or sensation of warmth arose, now nothing is given. New areas of felt bodily space arise; relatively to what had been felt heretofore, these new areas appear in different positions. There is little stability in the areas defined by the presence of localized sensations (warmth, cold, itch, tactile sensations, etc.). Imagine regressions and

recoveries in the different sensory field, occurring at different times. Imagine that this kind of experience goes on *ad infinitum*. By realizing that the kind of experience we have imagined can be final and never develop into another kind, we understand we have identified a pure possibility of experience that does not need to be intermingled with kinds of more complex experience.

The stream we have imagined presents experiences that are intentional and structured. There is experience *of* a sound, vision *of* a shape, touching *of* a surface, etc. There are minimal organizing structures such as association and contrast. A sound, a seen shape, a felt surface are unities in time and space, and they emerge from the background through contrast. The stream never posits other streams of consciousness and there never arise a motivation to do so. As a consequence, the experienced unities are nothing more than immanent unities, temporary formations within the stream of consciousness. There appears an experienced spatiality, but this is not experienced as the spatiotemporal actuality that is there-for-everyone. In short, we have imagined a world-less experience. A world-less experience is a pure possibility of experience.

The question of whether a world-less experience is possible is here decided through a purely philosophical method. It concerns a possibility that can be envisaged by means of eidetic variation. We can now look back at the chapters of this dissertation and better appreciate how each of them validated the idea of world-less experience. By substantiating the possibility of world-less experience, each chapter supports not just its own arguments, but also the arguments that rely on the same idea in other chapters. If, with regard to world-less experience, one is not convinced by the philosophical arguments of the first chapter, then he or she can perhaps be persuaded by the empirical

considerations of the second and third chapters. If, on the other hand, one is skeptical toward relying solely on empirical considerations, then one can consider the purely philosophical arguments of the first chapter.

In the first chapter, world-less experience is presented as a possible variation of my current experience. I identify the possibility according to which this new state of world-less experience goes on to infinity, i.e. is final and no longer controvertible. Assuming the validity of transcendental idealism, this possibility amounts to the possibility that the world does not exist. The world's existence is a correlate of an infinite process of future verification; if we imagine a possibility incompatible with this process, then we are imagining the possibility that the world does not exist despite our current experience of it. The insight into this possibility makes it clear that some propositions about my current experience can be true even if the world does not exist. Propositions about my actual(ized) experience that do not presuppose the world's existence are possible. By means of these propositions, one can exhibit the epistemic ground of the world's existence in a way that is sheltered from fallacious circularity. The harmoniousness of the immanent process of verification grounds my belief in the transcendent world. In the first chapter, the possibility of world-less experience helps show the non-circular justification of the world's existence.

If one is not persuaded by philosophical arguments, empirical considerations can be helpful. In the second and third chapters, I argue that human beings do not experience others as minded beings from two months before birth to two months after birth. However, they do have a growing and relatively well-structured sensorimotor experience. Such hypothesis is supported by behavioral and neuroscientific findings. Hence, in

providing a plausible phenomenological-psychological interpretation of the behavior of young infants, one is led to construct a flux of experience that posits no intersubjectivity and, therefore, no world—remember that world and intersubjectivity are defined as co-implicating each other.

Accordingly, the third chapter undermines a nativist argument concerning mental state attribution. Csibra (2010) thinks that mental state attribution must occur in virtue of an innate mechanism because this is the only kind of mechanism that can account for mental state attribution at birth. In contrast, I argue that it is more parsimonious and in accordance with the available findings to hypothesize that up to 8 weeks infants are still consolidating a kind of non-intersubjective experience. After this period, everything is in place for pairing to take place. Therefore, nativism has to compete with pairing as plausible explanation for mental state attribution.

There are a great number of findings on human beings from two months before birth to two months after birth. The more one tries to interpret these findings in light of the hypothesis of a non-intersubjective experience, the more one is obliged to specify details about what that non-intersubjective experience is like. In the third chapter, I emphasize aspects such as motor experience, innate instincts and dispositions, and auditory experience. Relying on the findings that intermodal perception and visual discrimination of shapes and figures occur in newborns (Bremner, 2005; Gallagher, 2005; Slater, 2002), one could also stress the organization of visual experience that precedes intersubjective experience. A phenomenologist who has engaged in early developmental psychology can more easily describe the meaningful structures of a stream of world-less

and non-intersubjective experience.[1] Indeed, while reading the description of the imaginary example of world-less experience suggested in these concluding remarks, the reader might have noticed how that description was, to a large extent, simply a transmutation of the infant experience in the realm of imaginary possibilities. As discussed in the introduction, the phenomenologist can transform an empirically posited experience into a pure possibility, drawing her examples from any field of science or human activity.

2. Questions about Grounding and Pairing

In the introduction, I raised the issue of determining the relationship between grounding (*Begründung*) and direct presentation (*Aufweisung*) in the case of the world's existence. After having proposed a formulation of the Husserlian solution to the epistemological problem of the world's existence (chapter 1), the particular application of those two concepts in this context can be better understood. Below, I report a long quotation from Husserl. This quotation does not only exemplify how Husserl uses the terms "grounding" and "direct presentation;" it also represents an excellent summary of the points I made in my first chapter.

> Thus, the regressive way of the grounding of a science that is absolutely to be justified (up to the ultimate element to be justified) begins with the direct presentation of the presupposition of both the empirical sciences and pre-scientific practical life. This presupposition is the *pre-givenness* of the world. From this presupposition, it moves on to demand the epistemic grounding of this

[1] I reject the view that experience arises from a state of total confusion over which the activity of discrimination is exercised. If there were no discrimination in the way in which sensory experience originally organizes itself, then active discrimination would never be possible.

> presupposition. As a consequence of this demand, it leads to the "bracketing" of the world's existence—to its strict remaining-in-suspension—and to the direct presentation of the ground of experience and being, to which the being that is in question is bound, as well as every way of deciding on theoretical matters and of providing justification. This ground of being has to be examined as the presupposition of knowledge for the knowledge of the world that is ultimately grounded. (Husserl, 1959, p. 476)[2]

This passage reveals a distinctively Husserlian line of thought. We can recapitulate it as follows. The grounding of science requires the direct presentation of its presupposition (the world belief). The grounding of this presupposition requires bracketing the world's existence and the direct presentation of transcendental experience. Transcendental experience is the ultimate presupposition of my knowledge of the world and its epistemic ground. However, a passage like this raises some questions. Why does the grounding of my world belief require the bracketing of the world's existence? In what sense is transcendental experience "the presupposition" of my belief in the world? In what way is my belief justified?

Let us rephrase the Husserlian line of thought according to the considerations made in the first chapter. The search for the ultimate epistemic ground for science requires acknowledging the presupposition of both empirical science and practical life,

[2] "Der regressive Weg der Begründung einer absolut rechtfertigenden (einer bis ins Letzte zu begründenden) *Wissenschaft* führt also von der Aufweisung der Voraussetzung, welche in der *Vorgegebenheit* der Welt für die positiven Wissenschaften wie schon für das vorwissenschaftliche Erfahrungsleben besteht, zur Forderung der Begründung dieser Voraussetzung; in Konsequenz davon zur Forderung der „Einklammerung" der Weltexistenz (zu ihrem konsequenten In-Schwebe-bleiben) und zur Aufweisung des Erfahrungs- und Seins-bodens, an den das fragliche Sein und jeder Weg der Entscheidung und Begründung gebunden ist. Dieser Seinsboden muß nun thematisch werden als Erkenntnisvoraussetzung für eine letztbegründete Welterkenntnis."

i.e. the belief in the world's existence. It cannot be taken for granted that this presupposition constitutes the ultimate ground. Thus, one has to ask whether there is an epistemic ground for the world belief. If a philosopher wants to take this question seriously, she *must* be willing to perform the phenomenological reduction, at least as an attempt. Indeed, a ground for the world's existence that presupposes the world's existence is not really a ground; it is just the circular re-assertion of what was supposed to be grounded. The phenomenological reduction puts out of action the belief in the world's existence; if, after the performance of the reduction, there is still something that can be found, our knowledge of it will not rely on the world's existence. Let me emphasize this point. The phenomenological reduction is a method to guarantee that what is investigated does not presuppose the world's existence. If it has to be possible to exhibit an epistemic ground for the world's existence that is sheltered from circularity, a method of that kind must be available.

After the performance of the reduction, there is still something that can be known. The phenomenologist can point to, i.e. exhibit, the field of transcendental experience. Transcendental experience is manifested to us through direct presentation (in the mode of reflection). Because transcendental experience does not presuppose the existence of the world, it can function as the ground for my belief in it. As Husserl puts it, transcendental experience is "the presupposition of knowledge for the knowledge of the world that is ultimately grounded." It is impossible to know the world if transcendental experience is not given. Moreover, knowledge of the world has a ground. To know that the world exists is to believe that it is transcendent. My belief in the transcendent world is grounded in the immanent experience I have had so far. The continuous presence of the world as an

immanent phenomenon justifies the positing of the world as transcendent. The world as immanent phenomenon is nothing more than the correlate of my experience so far, just as it has presented itself in my present and past experience. To posit the world as transcendent means to posit that its presence (i.e., its "original manifestation") is not restricted to what has become actual for me so far, but rather that it extends into an infinite process of future verification.

At this point, we should take up another problem put forward in the introduction. There, I ask whether paring can be taken to be an eidetic proposition. Is pairing a necessary structure of the experience of others as minded beings? Does pairing apply to all imaginable cases of intersubjective experience? Can pairing be established through eidetic variation? In raising these questions, I have in mind a particular element of the theory of pairing, i.e., the idea that mental state attribution occurs in virtue of an association by similarity between my bodily behavior and the behavior of others. In the theory of pairing, similarity plays the crucial role of motivating the transfer of lived experience to a body other than mine. The acting body of the other presents traits I have experienced in my own action. It is because of this similarity that I interpret the action of the other in light of my own action and this interpretation involves the transfer of lived experience. Yet I do not have to become aware of the similarity between my behavior and hers; similarity operates tacitly.

Is it conceivable that a subject comes to attribute lived experiences to another without being motivated by the similarity between one's body and the other's body? The discussion of nativist explanations of mental state attribution obliged me to take such a possibility very seriously. Although, in the third chapter, I argue that nativist explanations

do not offer a convincing account of infant mental state attribution, they do point to the possibility of experiencing the other as a minded being without resorting to pairing. This possibility can be grasped by putting ourselves in the shoes of an imaginary infant.

Imagine that a month old baby sees its mother smiling. It immediately perceives the mother's smile as expressing a positive emotion. The infant sees not just a likable face, a surface that it likes; it sees a happy face, i.e., it sees happiness in the face of the other. A description of this kind can apply to our adult experience of a happy face as well. However, in the case of our adult experience, we can postulate that this direct perception of emotion presupposes previous perceptions of the same kind that were made possible through pairing. By referring to the infant, we now imagine an episode of mental state attribution that does not involve the motivating role played by association via similarity. Imagine that it is a simple, original fact of the life of the infant that, when the mother smiles, it sees a happy face. A happy face appears. If this is an original fact, a phenomenologist has no more elucidations to offer. There are no features of the stream of experience that explain why the episode of mental state attribution has occurred. If there is an explanation, it has to be extra-phenomenological. For instance, we could hypothesize that the brain of the infant possesses an innate mechanism by which the visual stimuli of a smile are directly connected to the representation of happiness. We can imagine another example in which the infant perceives the mother's vocalizations as expressing her intention to communicate. Again, from the phenomenological point of view, this would be an original fact, a fact that cannot be explicated through a particular dynamic of lived experience such as a transfer motivated by similarity.

The stream of experience we are imagining does not instantiate pairing. Nevertheless, it does instantiate the law "It takes one to know one" (Nenon, 2002). We discussed this law in the introduction. It simply requires that basic kinds of experience be first-personally experienced before they are perceived as belonging to someone else. For instance, if I have no first-personal experience of happiness, I cannot understand what it means for another to undergo happiness. In other words, in order to "intend" (in the phenomenological sense) an episode of happiness that is not lived by me, I use my experience of happiness as a resource of meaning. In our example of the fictional infant, we can easily imagine that the baby has undergone happiness or other experiences in its first month of life. Accordingly, when the fictional baby perceives the same experiences in others, it is employing its own experience as a resource.

The crucial point is that, in interpreting the visual stimuli as expressing emotion, the fictional infant does not need to be motivated by the similarity between its behavior and the other's behavior. The latter behavior might not be more similar to its own than any other visual stimulus. Phenomenologically speaking, it would be simply an original fact that an emotion embodied in a seen face appears. If we wanted an explanation of this fact, we would probably resort to the idea of an innate brain mechanism that connect specific visual input to a representation of happiness—with the clause that, for the mechanism to operate the connection, the representation of happiness must have been activated before for independent reasons. The moral of this story is that the formula "It takes one to know one" can be true even if pairing is false. This happens when the perception of the other's mental state is not motivated by similarity.

That pairing is not a necessity was implicit in how I described it in the second and the third chapters. I claimed that the infant interprets the grasping as a goal-directed movement because the movement presents similarities with its own grasping. However, I stressed that similarity operates tacitly (see, for example, Section 6 of the second chapter). This means that, in my view, when an infant sees another grasping, it does not have to think about its own grasping: it simply sees a grasping and that grasping happen to be executed by someone else. Similarity originates the transfer of goal-directedness, but does not become an object of awareness. Now, to a large extent, the fictional infant has the same phenomenal experience of (what I believe to be) the real infant: it simply sees a grasping as goal-directed. The difference between the real infant and the fictional infant is that the former attributes goal-directedness in virtue of the similarity with its own behavior, whereas in the latter the attribution of goal-directedness is an original phenomenological fact. When, in the second and third chapters, I claim that similarity originates mental state attribution, I do not imply that similarity is an object of awareness. Therefore, it is not difficult for me to imagine an episode of mental state attribution that gets rid of the tacit functioning of similarity but maintains the phenomenal experience of perceiving a mental state in the other's behavior.

Admittedly, these are quick remarks for a topic that deserves a more careful examination. As a provisional conclusion, let me state that I think that it is possible to imagine a perception of the other as a minded being that does not presuppose a transfer based on similarity. Although I believe that that pairing applies to real infants, I do not think that pairing applies necessarily to all imaginable cases. In Husserlian language, pairing is not an eidetic proposition.

3. What comes next?

The dissertation intersects various topics that merit a separate in-depth discussion. In this final section, I would like to mention some topics that are touched on in this dissertation and that correspond to projects on which I am currently working or to which I intend to devote my efforts in the near future. A brief sketch of these projects helps put the dissertation into perspective.

The first project is exegetical and concerns Merleau-Ponty. Many interpreters of Merleau-Ponty's lectures on child psychology (e.g., Mclaren, 2008; Welsh, 2013; Whitney, 2012) tend to read these lectures as if Merleau-Ponty claimed that infants lived in a state of self-other confusion or "syncretic sociability" from birth. This way of interpreting Merleau-Ponty is unilateral and, in some respects, it is explicitly contradicted by the text. Let me mention just three facts that scholars usually neglect: (a) Merleau-Ponty argues that the experience of one's body precedes the experience of the other as a minded being; (b) according to Merleau-Ponty, from birth to six months the infant does not perceive the mental states of others—syncretic sociability regards a successive period that goes from six months to three years; (c) Merleau-Ponty endorses the theory of pairing as a theory of perceptual experience that cannot be conflated with the traditional model of the inference by analogy. I believe that one of the main reasons why scholars dismiss this textual evidence (Merleau-Ponty, 1964b, 2010) is that they sympathize with the ontological-metaphysical aspects of Merleau-Ponty's philosophy that stress the idea of self-other confusion. However, in doing so, they neglect genuine phenomenological insights present in Merleau-Ponty's work. In the near future, I would like to contribute to a clarification of Merleau-Ponty's view on the developmental origins of intersubjectivity.

In this dissertation, I did not tackle the problem of self-other differentiation in infancy. Indeed, I discussed how infants come to experience others as minded beings, but I did not specify reasons to believe that the minded beings experienced through pairing are not a mere extension of the self. This topic needs to be dealt with if I want to give a full picture of what the theory of pairing implies. With regard to the relationship between pairing and self-other differentiation, two considerations will play an important role: 1) by definition, an experience that is "transferred" through pairing is not first-personally experienced; 2) the other's body is "there," i.e. it is in a position that is incompatible with the "here" of my body. Furthermore, I will have to take into close consideration work in recent developmental psychology that traces the origins of the sense of self in early motor behavior (even before birth). Because the sense of self and others continuously changes throughout infancy, I prefer to speak of "experience of self" (as opposed to "experience of others") rather than "sense of self." However, I acknowledge that, from the beginning, the experience of self coalesces into a unity of experience that can be called "self." This self is given as stable bodily space that is felt from within and as the organ/originator of action.

In the second chapter, the phenomenological description of the functioning of association by similarity—similarity does not entail recognition—originates a competitive model of neonatal imitation for the field of cognitive developmental psychology. Analogously, the theory of pairing discussed in the third chapter suggests a novel theoretical proposal for the origins of mirror neurons. Let me recall very briefly what mirror neurons are and the current dominant hypotheses on how they originate.

Mirror neurons are activated both during action execution and action observation. When I see an action, I activate the same neurons that fire when I execute the same actions. Thus, mirror neurons are claimed to subserve action understanding because they allow a subject to understand the action of others in terms of its own actions. Currently, there are two dominant hypotheses concerning the origins of mirror neurons. The hypothesis that was initially prevalent was that mirror neurons are a genetic adaptation. According to this genetic account, monkeys and humans evolved in such a way that their brains automatically connect a visual representation (action observation) to a motor representation (action execution). A more recent hypothesis, which is gaining growing consensus, is that infants learn to associate visual representations to motor representations (Cook et al., 2014). The key idea in this associationist model is that the connection between visual and motor representations comes about via contiguity and contingency. In other words, according to this hypothesis, throughout development the visual representation of action x (e.g., grasping) happens to be contiguous in time and contingent upon (i.e., has a significant statistical relation with) the motor representation of x. This is how the visual representation of x gets associated with the motor representation of x. As two main proponents of this hypothesis suggest, "our developmental environments have exposed us to more matching, x–x, than non-matching, x–y, sensorimotor relationships" (Ray & Heyes, 2011, p. 97).

The two hypotheses share a basic assumption: that there is nothing in common between the visual representation of x and its motor representation. This is why the visual representation cannot, by itself, awaken the motor representation of x. There must be either an innate connection or the connection must be established through contiguity and

contingency. There is nothing intrinsic to the visual representation of x that is capable of awakening the motor representation of x. In contrast, the theory of pairing leads us to challenge precisely this assumption. Instead of an extrinsic link between action observation and action execution (i.e. a link that is formed either genetically or through contiguity/contingency), the theory of pairing leads us to hypothesize that there is an intrinsic link between action observation and action execution. According to my interpretation of the theory of pairing, there are commonalities between action observation and action execution; in virtues of these commonalities, action observation activates the representation of action execution. Therefore, there is no need that the association be established genetically or through a kind of Pavlovian learning. The visual representation is capable, by itself, of evoking the motor representation.

With regard to mirror neurons, the theory of pairing suggests an answer to the question: "Why do I interpret the actions I see in terms of the actions I do?" The answer is that this kind of assimilation is not caused by an innate mechanism specifically evolved for this purpose, nor is it the result of a developmental environment that offered the observation of x as contiguous and contingent upon the execution of x. Rather, I interpret the actions I see in terms of the actions I do simply because the former present similarities with the latter. As I explained in the third chapter (section 1.2), this is an ordinary dynamic of perception. If the theory of paring is correct, the only developmental requirement for the functioning of mirror neurons is that infants act on their own before they understand others in terms of their own actions. At present, nobody would deny that this developmental requirement is actually in place. Thus, the model of the origins of mirror neurons deriving from the theory of pairing appears to be advantageous with

respect to parsimony, because it does not stipulate specific additional requirements on development or evolution. I am currently working on elucidating the differences between this model and the dominant associationist model, which relies on association by contiguity/contingency but rejects similarity.[3]

Finally, I need to raise an issue that reminds us of the limited scope of the discussion of pairing in this dissertation. Does pairing entail shared intentionality? Does pairing imply the constitution of a "we"? In the third chapter, I hinted at an affirmative answer to these questions, but I did not take up the discussion. It has to be clarified in what sense pairing is the constitution of a pair, i.e. in what sense self and others appears as members of the same system. Moreover, specific questions about shared intentionality need to be addressed. When the infant perceives the other's movement as goal-directed grasping, is it experiencing a common world to which both self and others refer? When paring occurs in a joyful interaction with the caregiver, does the infant experience the caregiver as enjoying the same interaction it is enjoying? The aspect of pairing on which I focus in this dissertation is the transfer of lived experience based on similarity, but this aspect does not exhaust the potentialities of the notion of pairing. In particular, the relationships between pairing and shared intentionality/the constitution of the "we" will have to be determined as I intend to give a more comprehensive and precise characterization of pairing.

[3] Currently, the proponents of the associationist model explicitly reject the role played by similarity, e.g. ,Ray & Heyes, 2011, p. 97: "the associative mechanisms that make imitation possible via matching vertical associations do not encode or 'know about' similarity."

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