Developmental phenomenology: examples from social cognition

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Abstract

We explore relationships between phenomenology and developmental psychology through an in-depth analysis of a particular problem in social cognition: the most fundamental access to other minds. In the first part of the paper, we examine how developmental science can benefit phenomenology. We explicate the connection between cognitive psychology and developmental phenomenology as a form of constructive phenomenological psychology. Nativism in contemporary science constitutes a strong impulse to conceive of the possibility of an innate ability to perceive others' mental states, an idea which also has a transcendental implication. In the second part, we consider how phenomenology can contribute to developmental science. Phenomenology can go beyond the necessary evaluation and reinterpretation of experimental results. Some phenomenological notions and theories can be put forward on a par with alternative cognitive-psychological models and compete with them on grounds of empirical adequacy. For example, Husserl and Merleau-Ponty's notion of pairing can constitute a viable account of how infants access other minds. We outline a number of ways in which this account can be tested and can thus contribute to generating empirical knowledge.

Keywords Phenomenological psychology · Social cognition · Infant development · Pairing · Direct social perception

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1 Introduction

Numerous scholars have discussed the relationships between phenomenology and developmental science or made concrete use of such relations to support their own claims.¹ Significant figures of the phenomenological tradition have often talked about infants and children, especially to exemplify the fundamental structures of the phenomena they were after.² In this context, the term "fundamental" indicates a phenomenon that is presupposed by other phenomena of the same domain (higher order phenomena) but does not presuppose them in turn. For example, Husserl and Ricoeur reflect on infants to specify what the most primitive and minimal form of an action might be; so-called basic actions which make possible all other more complex and sophisticated forms of action that we carry out as children and adults.³

In this paper, we explore relationships between phenomenology and developmental science through the detailed discussion of a particular example: an in-depth analysis of the problem of the most fundamental access to other minds. Our discussion unfolds according to the idea of "mutual enlightenment" between phenomenology and cognitive science.⁴ The first part of the paper examines how developmental science can benefit phenomenology. The second part considers how phenomenology can contribute to developmental science.

2 The relevance of developmental science to phenomenology

2.1 A methodology of developmental phenomenology

To elucidate the implications of developmental science for phenomenology, we start with some methodological considerations. Phenomenology can approach its field of inquiry in at least two ways. First, it can investigate lived experience from within the "natural attitude" of ordinary life and science. In the natural attitude we take the physical things we deal with as belonging to the world. We also find beings, such as human beings and other animals, endowed with lived experience. If we decide to carry out a systematic investigation of their lived experience, we embark on the project called "phenomenological psychology."⁵ This study of "psychic processes" was regarded in great esteem by Husserl.⁶ It is also the one that most strictly concerns the issue of the relationship between phenomenology and developmental science. Thus, the focus of this paper is on phenomenological psychology.

¹ See Bower (2015) for a review.

² Husserl (1973), Merleau-Ponty (2010) and Ricoeur (1966).

³ Husserl (2006) and Ricoeur (1966).

⁴ Gallagher and Zahavi (2012).

⁵ Husserl (1997).

⁶ Husserl (1989, p. 426).

A second way of approaching the field of lived experience entails a suspension of our acceptance of the natural attitude as the ground of the investigation.⁷ One of the motivations for this suspension is epistemological: to exhibit the epistemic ground that supports our belief that each of us is a human being existing in a spatiotemporal world with other human beings who are also aware of the same world.⁸ This approach relies on a transcendental attitude rather than a natural attitude.

We emphasize here that there is a systematic connection between transcendental phenomenology and phenomenological psychology, deriving from the fact that both investigate the same field of inquiry, only from a different perspective. Whether the phenomenologist's perspective is based on the natural attitude or not will depend on her philosophical motivation, i.e. on what goal she has chosen for her investigation. The practiced phenomenologist, however, is able to shift from any phenomenological consideration relying on the natural attitude to a correspondent one that is not, i.e. she will be able to appropriate any psychological proposition from a transcendental perspective and vice versa. As Husserl puts it in a passage underscored by Merleau-Ponty: "To every eidetic, as well as to every empirical, constataion on the one side, a parallel must correspond on the other side."⁹ Accordingly, if developmental science helps achieve a result in phenomenological psychology, it will have facilitated achieving the correspondent result in transcendental phenomenology. The practiced phenomenologist will need only the suitable change of attitude to re-appropriate the result in a transcendental perspective.

Both psychological and transcendental phenomenologies include investigations of the *genesis*, or origins, of specific types of lived experience. A *genetic* investigation seeks to determine how the development of consciousness across time has brought about a specific type of lived experience. In other words, genetic phenomenology explains how lived experiences can come about based on past experience, affects, acts, associations, and various kinds of subjective processes. In the genetic context, the phenomenologist faces classical problems in psychology: how does a subject acquire "'the idea of space,' the 'idea of time,' the 'idea of a physical thing,' and so forth."¹⁰ These are some of the same questions tackled by developmental science. The connections between phenomenology and developmental science are most evident in reference to genetic phenomenology, and in this paper we focus on genetic phenomenology to throw light on those connections.

There are various forms of intentionality that present us with the lived experiences of others. Some are *perceptual* and *directly* present us with the subjective meaning of others' expressive behaviors. This intuitive access to other people's experiences often depends on our past perception of people and on our present knowledge of the context. We are presented with others' experiences through our understanding of their verbal communication or through suppositions we make in trying to interpret behaviors hard to decipher. All these forms of intentionality have

⁷ Husserl (1999).

⁸ Husserl (1989; 1997).

⁹ Husserl (1989, p. 414) and Merleau-Ponty (1964, p. 72).

¹⁰ Husserl (1999, p. 76).

various degrees of certainty. When we investigate facts of consciousness guided by a scientific interest we are practicing empirical phenomenology.¹¹

There are developmentalists who investigate conscious experience in the early stages of human life,¹² but most cognitive developmental psychologists would say that their research is about behavior or cognition, not consciousness. If one seeks to determine how cognitive developmental psychology can connect with phenomenology, it has to be assumed that the results of cognitive psychology can be *indicative* of the lived experience of infants. Both cognitive process in cognitive science and lived experience in phenomenology have an indispensable relation with behavior. Cognitive processes explain behavioral findings. Behavior expresses lived experience.¹³ Therefore, cognitive processes and lived experience are linked in that the former explain behaviors that express the latter. Even developmentalists like Gopnik and Meltzoff, who deny the importance of considerations about consciousness for cognitive psychology, end up supposing that infant behavior is often expressive of lived experience corresponding to the cognitive process they postulate.¹⁴

When we determine what experiences infants live through based on specific results in cognitive psychology, we are undertaking a kind of phenomenology. This *developmental phenomenology* is not based on reflection on one's own experiences, which infants cannot yet verbally report, but crucially relies on the interpretation of third person data. For this reason, it can be described as "constructive." In this respect developmental phenomenology is a *constructive empirical genetic form of phenomenological psychology*. Here are some general traits of how it might work.

First of all, we have a natural perception of infants as minded beings. Whether one is a cognitivist psychologist or phenomenologist or parent, one cannot help perceiving the behavior of infants as expressive of lived experience. One of the tenets of phenomenology is the reevaluation of *lifeworld* knowledge: without ordinary experience of the world scientific knowledge would not be possible and would lose its meaning.¹⁵ It is also a paradigmatic assumption of cognitive science that our basic cognitive processes are veridical.¹⁶ Hence developmental phenomenology should take its departure from our immediate experience of the subjective meaning of infants' behavior and even consider it a source of knowledge, although one that must be examined critically and as rigorously as possible. For example, we cannot assume that infants' expressions have the same social meaning of similar expressions we perceive in adults; yet refraining from interpreting those expressions as expressive of some kind of lived experience would be unreasonable.

Intuitive access to lived experience does not take one far beyond the attribution of basic intentions, emotions, perceptions, and attentive concern. More complex experiential processes are more ambiguously expressed. One needs to examine infant

¹¹ Husserl (1989, pp. 409–411, 1997, p. 176, 1999, pp. 69–70).

¹² Trevarthen and Reddy (2007).

¹³ Merleau-Ponty (1963, 2012).

¹⁴ Gopnik and Meltzoff (1997, pp. 22–23).

¹⁵ Merleau-Ponty (2012).

¹⁶ Gopnik and Meltzoff (1997, pp. 15–20).

behavior in a thoughtful reflective manner and needs data capable of distinguishing between different hypotheses. Hence the connection with cognitive psychology, which provides quantitative behavioral data from infants in strategic, highly controlled situations. Results obtained in this way are often generalizable and can ground reasonable inferences to the domain of lived experience. The plausibility of a developmental phenomenological hypothesis depends primarily on the extent to which it accords with behavioral findings.

Furthermore, there must be at least a plausible interpretation of the neuroscientific data that is compatible with the developmental phenomenological hypothesis in question. For example, the hypothesis that the human newborn is endowed with lived experience is supported by a large variety of neuroscientific and behavioral findings.¹⁷

Lastly, developmental phenomenology will try to make the most of the conceptual tools inherited from the phenomenological tradition. There is a vast scientific literature attributing consciousness to organisms very different from adult human beings: fish, arthropods, and octopuses.¹⁸ Just as in the case of the reconstruction of infant experience, this literature urges the clarification of what minimal forms of consciousness may be like. The phenomenological tradition has elaborated, for example, a notion of pre-reflective, bodily, transitory, present-focused, quick-forgotten (and in a sense irretrievable) lived experience that may be applicable to cognitively simple organisms.¹⁹

2.2 Exemplifying the relevance of developmental science: infant social cognition

In this section, we put forward an example of the relevance of developmental science to phenomenology. The example concerns the problem of explaining the most primitive and fundamental access to other minds. The phenomenological proposal in this regard consists in the idea—known as Direct Social Perception (DSP)—that the most fundamental access to other minds is direct and perceptual.²⁰

Phenomenology concurs with Piaget and cognitive science that the perception of an ordinary (cultural) object “at a glance” entails assimilating sensory configurations to experience-originated perceptual schemas.²¹ This one-shot perceptual categorization implies a previous “institution” of the global schema and a similarity-based apprehension.²² Furthermore, assimilation entails *accommodation*. Take Husserl’s example. A child experiences for the first time the meaning of a pair of scissors. At a later time, the child sees a pair of scissors she has never seen before and that nobody is using. The child recognizes the object at first glance as scissors, although its physical properties are somewhat different from the pair(s) of scissors experienced in the past. Differently from what was experienced before, this pair is thinner, metallic colored, smoother, etc.

¹⁷ Delafield-Butt and Gangopadhyay (2013).

¹⁸ Allen and Trestman (2017).

¹⁹ Gallagher and Zahavi (2012).

²⁰ Gallagher and Zahavi (2012).

²¹ Piaget 1954 and Vincini and Jhang (2018).

²² Husserl (1999, p. 111).

This means that certain elements of the global meaning previously experienced have been transferred to the present stimulus (in particular, its usability to cut paper; its general shape that affords grasping in a way relevant to its use), but others (e.g. specific dimensions, color, decorations) are not, because they are not compatible with what is given in the stimulus. Past elements are accommodated or adapted to the present stimulus in the sense that the elements incompatible with it are discounted.

We can note two further points of convergence with developmental psychology. First, object-perception requires bodily action. Perceptual assimilation is part and parcel of the sense making activity of the subject, aimed at satisfying vital concerns. Second, object perception originates in part from stimulus-driven sensory organization. Husserl designated these processes as “passive syntheses” (involving similarity, fusion, contrast, etc.). In accord with this, developmental psychology abandoned the image of the newborn experiencing a “blooming, buzzing confusion” and came to identify processes of stimulus-based, automatic perceptual organization.²³ Newborns (and late term fetuses) can discriminate between different shapes and voices, recognize them across time, recognize intermodal features, and are sensitive to Gestalt principles.²⁴ The sensory experience of newborns includes diachronic and synchronic unities that affect the infant emotionally.²⁵

Husserl and Merleau-Ponty suggest that the notion of “pairing” accounts for how infants come to experience other minds in the first place.²⁶ Pairing is a process of reciprocal similarity-based apprehension of self and other: because the same or similar features are experienced in self and other, the self tends to be experienced in light of the other,²⁷ and the other in light of the self. Pairing accounts for the perception of other minds as a similarity-based apprehension: *having experienced characteristic features of embodied animacy, emotions, intentions, and perceptions in myself, in so far as the other’s body presents the same or similar features, I tend to perceive it as embodying animacy, emotions, intentions, and perceptions.*²⁸ As indicated above, the nature of the apprehended unit, i.e. the other’s body, dictates constraints on assimilation. Pairing presupposes that my lived body is experienced as the center of spatial orientations, the “here,” and that the other’s body constitutes one of the many “theres.” Thus, the assimilative apprehension is constrained by the others’ body character as “there.” If the other’s intentions, for example, were first-personally experienced, I would have to experience the other’s body as my own and as a center of orientations, as the “here.” But this cannot occur because it is incompatible with my experience of the other’s body as a “there.”²⁹ Therefore, pairing requires that others’ intentions are either second or third-personally experienced.

²³ Streri et al. (2013) and Quinn and Bhatt (2009).

²⁴ Hepper (2015) and Simion et al. (2011).

²⁵ Husserl 1973.

²⁶ Husserl (1999) and Merleau-Ponty (1964, 2010, 2012).

²⁷ Merleau-Ponty (1964, pp. 145–148).

²⁸ De Preester (2008) and Zahavi (2012).

²⁹ Husserl (1999, pp. 118–119).

A variety of findings in contemporary developmental psychology suggests that pairing is a viable hypothesis for how infants come to perceive other minds.³⁰ In the domain where empirical research is most advanced, i.e. action perception, there is even an eminent developmental-psychological theory that is essentially equivalent to the notion of pairing.³¹ Pairing may be facilitated not just through domain-general affects that pull the infant into interaction with the caregiver, but also by means of innate needs for proper social relations.³² Indeed, in general, the features of the stimuli soliciting a specific perceptual apprehension reflect criteria of (affective) relevance. If certain features make possible a pairing apprehension of the other in one circumstance, they acquire a vital relevance for the infant—who needs proper social relations—and will solicit pairing in other circumstances too, even if the new circumstances present other features that would not by themselves facilitate the perception of other minds (as occurs when infants perceive inanimate objects as animate).

If the phenomenologist is sympathetic with Husserl and Merleau-Ponty's rich analyses of embodied perception and has surveyed the applicability of the notion of pairing to early development (as Husserl and Merleau-Ponty did), she may be tempted to feel satisfied with the pairing solution to the problem of the most fundamental experience of other minds. This satisfaction is challenged, however, by the widespread nativist approach of contemporary cognitive psychology.³³ This approach postulates a specialized module selected in the course of evolution that allows infants to infer and reason about others' mental states (sometimes on the basis of the innate knowledge of the principles of rational agency). The module is supposed to operate without any necessary reference to self-other similarity. For our purposes we can set aside the question of whether this approach is warranted by empirical findings. The phenomenologist should consider all possible explanations for a specific kind of phenomenon. Thus, the mere fact that there is a theoretical approach which dispenses with similarity-based apprehension obligates the phenomenologist to ponder the possibility of a primitive experience of other minds that is explained by something other than pairing.

In this way, the phenomenologist who is willing to maintain the idea of direct social perception (DSP) may consider the possibility of an innate perception of other minds as one form of DSP that does not presuppose self-other similarity or a pairing process. The object of this form of innate perception—i.e. what appears to the infant through the perception—would be the same as that of the similarity-based apprehension of the other in the pairing process. For example, both innate perception and pairing present a movement as goal-directed. The difference between the two is that the innate presentation of the intention is, from a phenomenological perspective, an "unanalyzable *factum brutum*."³⁴ Innate perception could only be considered as a primitive fact in the domain of consciousness. The maximum that can be said is that

³⁰ Vincini (2020).

³¹ Gerson and Woodward (2010).

³² Gallese (2009).

³³ Baillargeon et al. (2016).

³⁴ Zahavi (2012, p. 234).

the perception of another's intention or emotion is bestowed on a certain configuration of sensory experience.

In contrast to innate perception, the pairing presentation of someone else's intention or emotion is brought about by the activation of a content of past experience (e.g. goal-directedness) through association by similarity. Therefore, it is explainable as the result of the associative process combining sensory appearances with past experience. As noted above, the process is assimilative and accommodative, i.e. it adapts the reactivated content to the constraints of the apprehended unit—e.g. that the apprehended body is not mine. We emphasize that the associative process at work both in ordinary object perception and pairing regulates the genesis of conscious experience, but is not itself a conscious process. When I see a coffee mug, I have no awareness of the associative process with my past experience of mugs; I can become conscious of it only through phenomenological reflection. Analogously, in pairing the other's mind appears without any awareness of an association with first-person embodied experience. For this reason, the percept of pairing and innate perception can be said to be the same: e.g., someone else's intention or emotion, despite involving different processes.

Accordingly, from a phenomenological perspective, there is no reason to exclude the possibility of innate perception. Hence the possibility of innate perception has a remarkable implication for the analysis of the essential features of the basic perceptual experience of other minds: namely, in this regard, pairing is certainly a possibility, but does not represent an essential necessity. The spread of nativism in cognitive psychology makes it impossible for a present-day phenomenologist to neglect this possibility. Here we see an example of the relevance of cognitive developmental psychology for phenomenology.

In our analysis the notion of innate perception has been operating so far at the psychological level. However, one can reanimate the epistemological motivations for assuming the transcendental attitude and formulate the transcendental implication of the possibility of innate perception: the perception of a body as expressive of mind can occur initially *without any rational ground* in the experience of the individual; it is up to the successive course of experience to confirm or disconfirm the positing of mind inherent to the initial perception.

The significance of this consideration can be highlighted through the contrast with the notion of pairing. Pairing represents the possibility that even the initial perception of other minds be rationally grounded. In phenomenology, one of the criteria for the rational character of an existential positing is the concordance of a plurality of appearances.³⁵ Even if I see the coffee mug only from one perspective and at a glance, my perceptual belief in its existence (rather than the existence of a ball, a radio, or nothing on the table) is grounded in the concordance (similarity) of current and previous appearances. Analogously, the pairing interpretation of another body as animate is grounded by the concordance with the experience of my own animate body. Evidently, the rationality of the initial positing does not dispense with the

³⁵ Husserl (1989, pp. 234–235).

necessity of verification in the successive course of experience. But the difference in rational, or epistemic, groundedness between pairing and innate perception reminds us that if developmental science motivates a phenomenological consideration at the psychological level, it facilitates the parallel transcendental consideration as well (always on the condition that one is willing to shift to the transcendental attitude).

Importantly, even if phenomenology needs to distinguish pairing and innate perception for all the foregoing reasons, it is certainly possible to use them as complementary notions to account for socio-cognitive development. Infants may come to perceive some mental states of others through innate perceptions and others through pairing, or they may come to perceive others first through innate perception and then extend the scope of this perception through pairing, etc. It is empirical research, phenomenologically enlightened, that has to determine whether and how the two notions have to be combined in a unitary explanation of the developmental emergence of the earliest access to other minds.

3 The relevance of phenomenology to developmental science

3.1 Pragmatic considerations

There is a pragmatic approach for putting phenomenology into use in cognitive psychology. Both cognitive psychology and phenomenology use terms from ordinary language: “perception,” “association,” “action,” “emotion,” “solicitation,” “assimilation,” “accommodation,” etc. Some expressions are more frequent in psychology than in phenomenology, e.g. (perceptual) “generalization,” or vice versa, e.g. (perceptual) “apprehension.” Both a phenomenologist and a cognitive psychologist can understand how the processes these terms designate can fulfill a function for the concrete subjects under consideration (infants)—and, to clarify this function, they do not need to explain to one another the methodological or theoretical assumptions consolidated in their respective traditions. The pragmatic and direct approach, then, consists in working with notions and theories from the phenomenological tradition to describe cognitive processes. These notions and theories would aim at making behavior intelligible from a scientific standpoint and to a scientific audience, without raising phenomenological issues about the status of lived experience. In other words, some phenomenological notions and theories can be put forward on a par with alternative cognitive-psychological models and compete with them on their ground, i.e. that of empirical adequacy, the explanation and prediction of behavior and biological (neuroscientific) plausibility.

Vincini and Jhang followed this strategy with regard to a specific phenomenon debated in developmental psychology.³⁶ They formulated a cognitive model of neonatal imitation availing themselves of the way the notion of “association by similarity” is used in phenomenology. They argued that their hypothesis accounted for the extant findings better than alternative models and suggested further ways to test their

³⁶ Vincini and Jhang (2018).

hypothesis empirically. Arguably, this is the route that a phenomenological conception of DSP has to take if it wishes to become a competitive model in cognitive psychology. There are already some developmentalists who would endorse DSP as the basic way of accessing other minds,³⁷ but what could convince cognitive psychologists to take DSP seriously if not its capacity to explain and predict empirical findings?

Proposing a phenomenological model for a developmental phenomenon entails three steps. The first step is to show that the model can account for the extant findings. The second step is to criticize cognitivist interpretations of the behavioral findings that could undermine the phenomenological model. The third step consists in specifying the ways the model can be tested so that it may actually inform empirical research. Such a step is called “front-loaded phenomenology.”³⁸ In Sect. 2.2, we examine the question of how DSP could be front-loaded.

We note that the phenomenological approach accentuates a heuristic use of imagination already present in the developmental literature. For example, Heyes suggests that we have to “imagine the infant’s experience” in order to formulate alternatives to nativist cognitivist explanations of the experimental findings.³⁹ Her use of imagination is far from being a superficial reiteration of common sense; rather, it is a theory-loaded exercise that requires her to “resist the intuitive pull of [nativist mentalistic] interpretations.” Heyes’ deflationary interpretation, however, may be closer to a phenomenological account than cognitive nativism, which tends to reject phenomenological constraints in so far as these are incompatible with its theoretical assumptions (which frame the experiments). The deflationary interpretation derives, in part, from the attempt to explain the findings in a way that is consistent with a plausible phenomenological reconstruction of infant experience. Nonetheless, from a phenomenologically-informed enactivist perspective, perception is always action-oriented because it serves the vital and affective functions of the organism. This contrasts with the deflationary emphasis on low-level perceptual properties (“shapes,” “colors,” “speed,” etc.) that cannot affect infant behavior by themselves, but only insofar as they relate to infants’ interests and needs. The nexus between perception and affectivity must be made explicit.⁴⁰

3.2 Preliminaries for front-loading DSP

Front-loading phenomenology is possible as a collaborative enterprise with experimental psychologists who share theoretical inclinations and intents. The phenomenologist can interact and exchange ideas with the developmentalist in a way that the final product will likely be different from what either could have imagined without the collaboration. In this section, we describe some lines of research in developmental science where the phenomenologist could engage with empirical issues through

³⁷ Astington and Hughes (2013).

³⁸ Gallagher and Zahavi (2012).

³⁹ Heyes (2014, p. 649).

⁴⁰ Gallagher (2015).

a strategy of front-loading the DSP framework, contributing to the design of experiments in a productive manner.

As indicated above, the DSP view can sustain two contrasting (or complementary) hypotheses, i.e., innate perception and pairing. Innate perception can be taken to account for the cases of DSP that cannot be explained through pairing. When there is no possible similarity between a previously experienced state and a perceived state DSP must be innate. Yet, this signals a problem. Independently of the notion of pairing, the literature has not specified which stimuli solicit a DSP and which do not. In contrast, cognitivist nativism has identified in a detailed manner a number of stimulus features that are supposed to provoke the attribution of a low-level intention. This precise identification is what has made it possible to formulate experiments that test cognitivist nativist hypotheses. Indeed, a typical experiment entails comparing a condition that is supposed to solicit goal attribution with control conditions that are not. In this respect, it seems that innate perception depends entirely on cognitive nativism or on hypotheses that do not derive from phenomenological reflection (e.g. evolutionary hypotheses). Can phenomenology establish some criteria for the kind of stimuli to be innately perceived as minded beings? Are there phenomenological constraints on the nature of this class of stimuli? An answer to this question, which remains unresolved, is important if a phenomenological account of innate perception seeks to actively contribute to empirical research.

The same problem does not arise for the notion of pairing. This notion implies reference to first-person experience, although it allows for rapid generalization and for the indispensable cases in which external perception induces a new configuration of elements that have been experienced first-personally only in separate occasions. At least initially, an infant perceives another's intentions or emotions or global animacy only insofar as the other's behavior presents features the infant has already lived through in her own experience. This kind of restriction of the relevant stimuli has made possible the impressive literature on developmental action-perception mirroring. Part of the mirroring literature attests in a particularly cogent way to the causal nexus between action experience and action perception.⁴¹

It is self-other similarity that empirical research, aimed at testing a pairing account of infant DSP, would bring to the fore. One way to do it is to investigate imitation and imitation recognition from an ideomotor perspective, which also postulates a "functional role for [self-other] similarity."⁴² Beyond the still ambiguous issue of neonatal imitation, there are findings on the imitation of vocalizations and (hand, head, body-directed, etc.) actions from 2 to 9 months.⁴³ Nonetheless, it would be helpful if future research strengthened these findings, especially with regard to imitation recognition from 2-6 months, which is the period in which DSP (on the pairing account) is first likely to occur.

The recognition of being imitated, or better, the recognition of same or similar features in the gestures of self and others, can be inferred from measuring the infant

⁴¹ Gerson and Woodward (2010).

⁴² Prinz (2002, p. 160).

⁴³ Gratier (2014) and Nadel et al. (2004).

responses to being imitated: gesture rates, reciprocal imitation (imitation of the adult's imitation of the infant), positive emotional expressions, staring from object to adult, and stop acting as well as the effects on the duration and quality of the interaction. It is important to compare these measurements to control conditions where the adult executes merely contingent (instead of imitative) gestures. Indeed, one needs to differentiate responses to similar actions from responses to actions that merely happen at the same time. Notably during interaction parents imitate infants once per minute⁴⁴ or from 200 to 400 times per day.⁴⁵ Therefore, showing that infants are sensitive to self-other similarities when being imitated is a considerable step in showing how pairing actually occurs.

Another way to find support for a pairing account is to investigate responses to stimuli that vary in their similarity to the infants' own gestures. For example, in relation to the infants' own vocalizations, the stimulus can vary from a recording of the infant's own voice to another infant's voice, an adult's voice, and a non-human sound. The preferential response can be quantified by associating the stimulus with a physiological response or the (rate of) production of an action like sucking, looking, or limb movement. The infant would produce the associated actions to prolong exposure to the preferred stimulus. The pairing account would find support if, especially in the crucial period from 2 to 6 months, one could detect differential responses based on the similarity with the infant's own vocalizations.

Other experiments of this kind would focus on proprioceptive-visual recognition, a key indicator of the possibility of early pairing. For instance, it would be important to establish the motivation of infants' positive reaction to seeing themselves in the mirror starting at 3 months of age. One of the most well-known contemporary models of imitation development, associative sequence learning (ASL), suggests that infants' positive reactions are motivated by the contingent character of the visual stimulus; indeed, ASL supposes that infant experiences with mirrors contributes to establishing an association between visually perceived actions and corresponding self-produced actions via contiguity and contingency—but not via similarity.⁴⁶ Showing that infants' positive reactions depend on the presence of the same morpho-kinetic features in proprioceptively experienced and perceived actions would constitute a further argument for the possibility of early pairing. This may be done by means of an apparatus that is not only capable of generating a mirror image, but also a modified image that presents the same contingency of the mirror image but decreases the level of similarity of the gestures. If infants exhibit a decrease of positive reactions in correlation with the modified image, it is because they register the decrease of similarity over and beyond the contingent character of the image. In this way, infants would demonstrate their sensitivity to the similarity of the mirror image.

Phenomenologically understood, emotion perception (or “emotion recognition”) is not just an adaptive reaction to the embodied emotion of the other, but the

⁴⁴ Ray and Heyes (2011).

⁴⁵ Jones and Yoshida (2011).

⁴⁶ Ray and Heyes (2011).

perception of an emotion as belonging to the body “over there” (that is not my body “here” through which I live my emotions). Vaillant-Molina et al. demonstrated that 5-month-olds could match the perceived vocal expressions of an emotion of another infant with the silent video of the facial expressions of the same emotion.⁴⁷ The video and the sound were not contingent, but they presented the same emotional valence. On a conservative interpretation, an infant could match the two stimuli because they had the same kind of emotional effect on her (e.g. positive instead of negative). Even if this is correct, infants must have been sensitive to the features of the stimulus expressing the emotion. In a pairing account, infants come to recognize another’s emotion because they have lived through the same kind of emotion and embodied it in a similar manner. This implies that embodying one’s own emotions and expressing them through physical features should make one sensitive to external stimuli presenting similar features. Hence one could vary the kinds of stimuli presented in a matching task from the infant’s own expressions to other infants’ expressions, adults’ expressions of the same emotions embodied by infants, adult emotions not embodied by infants, etc. One could test whether the difficulty of the matching task is inversely proportional to the similarity with the infant’s own expressions. Furthermore, it would be important to identify in a detailed manner the physical features expressing an emotion in infants, as Vaillant-Molina et al. began to do (e.g. associating happiness with softer, more gradual changes). This would allow one to predict in what circumstances emotion recognition is facilitated.

Plausibly, the primary locus of pairing is infant-caregiver interaction. This means that in early “proto-conversations” infants experience features common to self and others so that they start perceiving others as minded beings. As Fuchs and De Jaegher put it, self and other “resonate” with each other.⁴⁸ Consistent with assigning social interaction an indispensable role, extant studies already indicate that infant-caregiver coordination at 4 months predicts cognition and attachment at 12 months and that the degree of affective mirroring displayed by mothers predicts the social deployment of attention at 5 and 10 months.⁴⁹

A pairing account predicts that the more a social interaction presents self-other commonalities, the more it will facilitate the perception of others’ intentions and emotions. For this reason, it is important to identify the self-other commonalities that can be present in social exchanges such as: the character of the sounds produced, morpho-kinetic aspects of gestures proprioceptively and visually experienced, playing similar roles (initiating, maintaining, varying, terminating the affective tone of the interaction), contingency of one’s gestures on the other’s gestures, turn taking, bodily orientation, and being in the same place as part of the same temporally extended interaction. Infants who engage in interactions with a high level of self-other commonalities should perform better in a task that measures the perception of others’ intentions and emotions. For instance, they could perform better in a

⁴⁷ Vaillant-Molina et al. (2013).

⁴⁸ Fuchs and De Jaegher (2009).

⁴⁹ Legerstee (2005, pp. 153–158).

task like Woodward's, where infants have to show sensitivity to a change of goal.⁵⁰ It is true that interaction primarily promotes the global perception of the other as a minded being, but we reason that, if this truly happens, it will also facilitate the perception of the other's goal. Analogously, the time an infant spends in social interactions and how imitative her parents are should correlate with performance in a change of goal task at 5–6 months.

On this matter, cross-cultural studies can be highly significant: cultures where caregivers interact less with infants or interact in a manner that generates less self-other commonalities for the infant should present a delay in a social perception task. Moreover, a central role for the development of pairing must be assigned to vocalizations, given their importance in proto-conversations.⁵¹ One possible consequence is that deaf infants may show a delay in social perception. Meristo et al.'s report that deaf infants did not pass the spontaneous-response test on the comprehension of others' false beliefs, as opposed to hearing infants, is noteworthy.⁵² Meristo et al.'s own interpretation focuses on early social interaction.

Finally, attempts at reproducing in the emotion perception domain a counterpart of the findings on mirroring in action perception development would support a pairing account. These attempts would relate first-person emotion experience to emotion recognition, investigating first of all if the former precedes the latter (keeping in mind the distinction between emotional reaction and emotion recognition). In a playful and joyful face-to-face interaction parents often act as mirrors to infants: they produce matching facial and vocal gestures (smiles, laughs, mouth and head movements, etc.). The amount of time that infants spend in these and other playful interactions where infants and parents jointly act with objects should correlate with results on tests of emotion recognition or that rely in part on emotion recognition. Indeed, neural mirroring could be taken to be indicative of emotion recognition, as well as the capacity to expect a specific behavior toward an object after having attended to the (positive or negative) emotion of another subject.⁵³

4 Conclusion

In this paper, we have explored the mutual enlightenment between phenomenology and developmental science with regard to the problem of the most fundamental access to other minds. In cognitive psychology, nativism is one of the main currents when it comes to the attribution of intentions and emotions. Nativism affirms that early attribution occurs without an association by similarity with the infant's own experiences. Therefore, contemporary psychology provides a strong impulse to conceive of a counterpart of nativism in developmental phenomenology. Unlike Husserl and Merleau-Ponty, the contemporary phenomenologist can no longer neglect the

⁵⁰ Woodward (1998).

⁵¹ Husserl (1973, pp. 606–607, 1989, p. 101).

⁵² Meristo et al.'s (2016).

⁵³ Reschke et al. (2017).

possibility that the fundamental access to other minds may be an innate perception. From the phenomenological point of view, it would simply be an unanalyzable fact that specific configurations of sensory experiences solicit the perception of someone else's intentions or emotions. The phenomenologist can shift from the natural to the transcendental attitude and recognize the possibility that the initial perception of other minds lacks epistemic ground, though it can acquire it in the successive course of experience. Hence the debate about infant social perception is an example of how developmental science can push the phenomenologist to consider possibilities she may not have considered otherwise.

Phenomenology can go beyond the necessary evaluation and reinterpretation of experimental results. In a pragmatic approach, some phenomenological notions and theories can be put forward on a par with alternative cognitive-psychological models and compete with them on the ground of empirical adequacy. For example, Husserl and Merleau-Ponty's notion of pairing can constitute an account of how infants come to perceive others' mental states and contribute to empirical research. It motivates various investigations focusing on self-other similarity in the vocal and proprioceptive-visual domains. Decreasing the extent to which stimuli are similar to the infant's own embodied experiences should decrease recognition responses. Varying the degree of similarity should facilitate the matching of expressive visual and auditory stimuli. Pairing also promotes the study of infant-caregiver interaction. It encourages research on the correlation between the time spent in social interaction, the extent to which interaction presents self-other commonalities, and the emotional tone of interaction with infant performance on tasks indicative of the perception of others' intentions or emotions. In this case, front-loading phenomenology means that the phenomenologist—making use of the notion of pairing—collaborates with developmental psychologists in order to produce innovative findings in the field of infant social perception.

Our example has focused on direct social perception; a similar kind of mutual enlightenment is possible with regard to knowledge of higher order mental states, norms, social institutions, etc. Or one could take up in this interdisciplinary manner the problems mentioned by Husserl concerning the origins of “the idea of space,” the ‘idea of time,’ the ‘idea of a physical thing.’” There are many areas where the interaction between phenomenology and developmental science can be explored: indeed, it can be done for all kinds of objects of knowledge and for the entire life-world. For all the big issues common to the two fields, there are the following questions to be pursued: does developmental science confirm what we predict on the basis of the insights found in the phenomenological tradition? Does it promote new phenomenological insights? Can phenomenology guide the production of novel empirical data? The project thus envisaged is to pursue these questions in a systematic manner.

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