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Facial Embodiment in 'Invisible' Imitation

If the self gains access to life proper exclusively from 'inside', through an evanescent first-person sense of being the subject of its own acts, feelings, thoughts and desires, then any manifestation of internal states in external behavior can count as an indirect translation of an invisible mind into a manifest bodily performance, which reveals as much as it masks one's real intentions and desires. Social relations remain then a problem to be resolved rather than a field to be investigated. However, if embodiment is central to any theory of persons and to inter-personal communication, then the clear-cut distinction between the inside and the outside is blurred and the 'problem' of inter-personal communication ultimately resolved. If self and other are made of the same corporeal stuff and are similar despite differences, they can engage one with one another directly, through manifest behavior, without the need to translate some hidden invisible subjectivity into the visible mundane world. Communication begins already on the surface of the expressive face, in the tonality of the voice, in the affective charge of the gaze.

'Invisible' imitation and mirror theory

Studies in neonate imitation offer concrete and instructive material for the study of earliest expressions of such embodied communication with others. The communicative inter-personal engagement initially involves mimicry of a range of facial and manual gestures performed by the adult, such as tongue and lip protrusion, lip opening, finger movement (Meltzoff and Moore, 1977; 1989; 1994). It has therefore the character of a dyadic mirroring relation between self and other, where the infant puts her body proper in a resonance with the body of another human by echoing the gestures she sees the other perform. This act of mimicry is

a concrete instance of an early self-other relation anchored in the living body, since in order to imitate, the infant must realize that other human faces look the way her face proper feels, that there is a direct correspondence between the visual appearance of the other and the felt body proper. This body-to-body and face-to-face correspondence is not, however, an exclusively uni-directional (from other to self) but rather a bi-directional (from self to other) mapping process: infants can imitate others' gestures as well as recognize being imitated by others (Meltzoff, 1990; Meltzoff and Moore, 1995). The mimicry process engages therefore self and other in an equal measure because both parties share not only the same gesture but also the double experience of mirroring the other and being mirrored by the other. Despite its limited content and primitive echoing structure, this nonverbal corporeal exchange of neonate imitation has therefore a communicative character in that the two parties both respond and are responded to by the other.

Were neonate imitative performances mere reflexes, one could hardly speak of initial stages of interpersonal and intercorporeal communication in this case. However, neonate imitation cannot be termed automatic reflex behavior because it involves a wide variety of gestures (it would be difficult to argue for a special stimulus bound mechanism that regulates the performance of gestures as disparate as mouth opening, tongue protrusion, lip protrusion, smile and frown)¹ as well as novel gestures (Meltzoff and Moore, 1994). Another argument against infantile imitation being reflex bound is that it can be artificially postponed and enacted after delay (whereas reflexes do not jump temporal gaps). For example, the infant who watched the adult's facial gestural display while being engaged in the competing activity of sucking on a pacifier imitates the gesture once the pacifier has been removed, despite the fact that the adult no longer shows it (Meltzoff and Moore, 1977). Infants can also differentially imitate facial gestures after a 24-hour delay, with the adult who displayed the gesture on day 1 assuming a neutral face on day 2 (Meltzoff and Moore, 1994). Finally, imitating infants do not directly produce fully-fledged copies of the visual stimulus but first activate and experiment with the appropriate body part, such as the mouth, gradually arriving at the closest possible match of the target gesture (Meltzoff and Moore, 1977; 1983; 1994). Imitative response relies then on a teleological learning process, which cannot be described in purely deterministic and mechanistic terms. If not a reflex, what role does the early mimicry play?

The *raison d'être* of imitation lies in its potential to establish social ties. Following Meltzoff and Gopnik (1993), it is the "like me" experience, in the

¹ As Gallagher and Meltzoff (1996) note, "reflexes and releasing mechanisms are highly specific - that is, narrowly circumscribed to limited stimuli. One cannot have a releasing mechanism for imitation in general." (p. 222).

sense that “here is something like me,” which constitutes the sense of continuity between self and other that the infant strives to attain through the enactment of similar gestures. This primary sense of continuity does not equal identity or lack of differentiation between self and non-self: the ability to monitor and correct gestures through practice in order to attain the closest possible match of the gesture performed by the adult indicates that infants rely on proprioceptive feedback from their own bodies while imitating others and that the infant, from the start, has a sense of the body proper as distinct from the perceived body of the other. Infantile imitation provides, therefore, evidence for the presence of an innate body-schema and of a minimal sense of self gained through proprioception. One can therefore speak of relations *between* selves being established in infancy, where the infant senses both a similarity and difference between her own and another’s bodily performance.

Imitation is an interpersonal process not only because infants *de facto* mimic gestures they see other people perform, but also because they use others as visual models to guide their own gestural movements and so depend on others in the very accomplishment of their own facial expressions. This is most evident in cases of the so-called ‘invisible’ imitation, where the infant imitates seen facial gestures while being unable to visually access her own face. No visual representation of face proper, as in a mirror reflection, facilitates the infant’s efforts to produce the same gesture she sees the adult produce, and yet she is able to arrive at a close match of the visible facial expression with her own ‘invisible’ face. The visible face of the other guides infant’s unseen yet proprioceptively fed back facial movements directly, without the need to consult a representation of the face proper in self-reflection.

This phenomenon clearly challenges the requirement of mirror exposure which, following Piaget (1962), had to be met if infants were to be able to imitate facial expressions of others. Piaget believed it necessary for the infant to obtain a visual representation of her unseen countenance in order to bring it into a rapport with the seen countenance of the other, and to echo the other’s visible movements with the face proper.² A similar idea that specular self-representation is a necessary condition of relating to other selves is contained in Lacan’s mirror stage theory (1989). The discovery and identification with the image of bodily *Gestalt* reflected in the mirror is said to prepare the infant for relations with others by making him realize that “he can ... be seen by an external witness *at the very place at which*

² “For imitation of [facial] movements to be possible, there must be co-ordination of visual schemas with tactilo-kinesthetic schemas.” (Piaget, 1962, p. 45). Since a young child (prior to 8-12 months) has exclusively tactual and kinesthetic but no visual awareness of the movements of the face proper, according to Piaget, neonate facial imitation is therefore impossible.

he feels himself to be and with the same visual appearance that he has from the mirror.”³ Both Lacan’s and Piaget’s “mirror” theories stipulate then that a feature or element of the body proper which remains unseen to self due to bodily constitution (the bodily *Gestalt*, the face), needs to be brought to visual self-representation in a developmental stage which precedes and facilitates engagement with others, who can see one’s body proper in its entirety. Both theories stipulate that the self needs to produce a match between the body felt and the body seen on an intra-personal level prior to entering into inter-personal relations and that this match is made possible by the instrument of the mirror where the infant obtains the missing visual information concerning the body proper through representation and can conjoin it with the information she obtains through proprioception. Once the visual and the felt are conjoined in a solitary achievement aided by the mirror, the infant is able to relate to others for she knows herself to be visible in the way her fellow beings are. Since her sense of the body proper is no longer exclusively bound to feeling but includes visual self-awareness as well, she can enter the visible world and become an element of the continuity between (unseen) self and (seen) other in the “like me” experience.

Meltzoff et al. demonstrated by means of extensive evidence, however, that no such stage of visual self-discovery needs to be traversed for the infant to engage with visible others. Infantile match between the body felt and the body seen is effectuated directly in the face-to-face interaction. The authors call it active inter-modal matching (AIM) and argue that “infants monitor their own body movements by the internal sense of proprioception, and can detect cross-modal equivalents between those movements-as-felt and the movements they see performed by others” (Meltzoff and Gopnik, 1993, p. 336). No need therefore to unite the initially discrete domains of visibility and feeling, as was assumed by Piaget.⁴ Infants are able to cross-modally match internal kinesthetic sensations with the movements perceived in their fellow humans from age zero. There is therefore ground to postulate an innate ability to make a cross-modal transfer between the perception of a facial act and its enactment. Since infants grasp a structural equivalence between the modality of feeling and the modality of vision, they are able to make a transfer of a gesture such as tongue protrusion from its appearance on the face of the other to their own proprioceptively fed back facial movements and are therefore able to mimic facial gestures of the

³ Merleau-Ponty, 1964, p. 129/130. For a more extensive discussion of the mirror stage as preparatory to interpersonal relations, see Stawarska (in press).

⁴ According to Piaget (1954), sensory modalities, such as vision, touch, etc. belong to “heterogeneous spaces” existing initially in total independence one from the other. The infant gradually synthesizes these sensory systems and recognizes equivalencies between visual and tactile information.

other with their own unseen face. The inter-modal transfer allows infants to establish a parallel of similitude between the body proper and bodies of others by singling out a general gestural form or *eidōs* of e.g., tongue protrusion, which can be realized in the modality of vision as well as in the modality of feeling and which can find expression on the seen face of the other as well as on the unseen face proper. Since the visual side of a gesture is provided by the other and not by the reflection of body proper, the transfer between modalities of feeling and of vision in the model developed by Meltzoff is not confined to the intra-personal level but is directly inter-personal.

Following Meltzoff and Moore, the possibility of making this inter-modal transfer ultimately suggests that gestures are supra-modal representations, independent of both particular sense modalities and specific individuals.⁵ These supramodal gestural forms seem therefore akin to purely mental representations, belonging to what the authors call a “central supramodal representational system” (1997, p. 188). They are said to intervene in the process of neonate imitation of others wherein infants form a motor plan of the action to be performed, such as the intention to move the tongue, and relate it to the action performed by the other. The practice of imitation appears to be mediated by internal representations of intended acts, which function in the manner of (primitive) mental states. It seems therefore valid to postulate a theory of mind on the basis of the infantile practice of imitation.⁶

Internal representations

However, it is difficult to concede that infants need to consult ideational contents independent of proprioception in order to be able to match the visible gesture of the other. The major support for developing the claim that infants do employ such internal representations is provided by infants’ ability to perfect their imitative performance over time and to imitate after delay. The former case apparently suggests that infants employ an internal target model in order to improve the match between the gesture they perceive and the gesture they execute. However, as Gallagher observes (2001, p. 87), infants who perfect their imitative performance “need no internal plan to consult since they have a visual model

⁵ “[T]he perceived and produced human acts are coded within a common (supramodal) framework which enables infants to detect equivalence between their own acts and ones they see” (Meltzoff and Moore, 1997, p. 180).

⁶ “[E]arly imitation is relevant to developing theories of mind because it provides the first, primordial instance of infants’ making a connection between the visible world of others and the infants’ own internal states, the way the ‘feel’ themselves to be.” (Meltzoff and Gopnik 1993, p. 337).

right in front of them, namely the face of the other, as well as a proprioceptive feedback, namely the gesture that is taking shape on their own face.” Infants’ gradual improvement of imitative activity can be explained on the level of the inter-modal matching process alone, as motivated by infants’ initial inability to directly reverse the perceived behavior of the other into the felt behavior of the body proper, which prevents or interrupts the sense of the “like me” continuity between self and other that the infant strives to attain in this early exercise of human sociality. The aim or *telos* to be attained in infantile imitation would then not be a fixed facial expression captured in an internally stored image/representation of the visual target but rather the successful performance of mimicry itself, wherein the infant can actively engage with others through smooth and quasi-instantaneous mapping of their visible expressions onto her own body. The aim to be attained would thus not be separate from infantile activity in the sense of a distinct representation to be matched with one’s own proprioceptive feedback, but it would be the (perfected) activity itself, which translates directly into the perceived activity of the other.

If we posit internal representations as necessary intermediaries between self and other, then we deprive the process of inter-modal matching of its inherent inter-subjective significance: it would appear that the perfection of imitative performance is a solitary achievement, aided by subjective internal representations and attained independently of the other’s real presence. Such a model of self- other relations would not be a substantial advancement with regard to the one provided by the mirror stage theory: it also posits a necessary intermediary between self and other, a visual model which compensates for the self’s inability to see itself and which can be employed by the self alone. Surely, the visual model is provided by the other in the case of the AIM model, and it is the other’s expression that the infant strives to match. Still the self apparently need not actively interact with the other in order to match the model the other provides, since having a representation is sufficient for the purpose. The internal representation thus serves a role that is functionally similar to the mirror reflection in the mirror stage theory: it provides the missing visual counterpart of infant’s own unseen body which can be consulted independently of others, even though it is the real other - and not the self’s own minor image - that is the source of this visualization. Insofar as the other looks “like me,” I can use the representation of her face to guide my own imitative performance in a private experience of motor mastery; the role of the other in the life of the infantile self remains therefore, on this model, relegated to a secondary position as much as it was in the case in the mirror stage theory.

Let me now raise the question whether the case of deferred imitation, when infants imitate from memory, supports the representational thesis. In the absence of an active visual model in front of them, infants supposedly consult a “repre-”

tation of the visually perceived model" from the past (Meltzoff, 1993, p. 230), which they compare to the proprioceptive information from their own bodies. The temporal factor of delay between perception and action supposedly necessitates the use of representation for successful imitation. However, it seems invalid to invoke this time lapse in the case of an enforced delay as an argument for representation: imitation is a temporal process which by definition involves the non-identical phases of perception and action, both in the case of on-line and delayed imitation, and this double structure alone does not necessitate representational content. After all, imitation is a response to and not part of the perception of other's gestures. This double reception/reaction phase structure distinguishes imitative performance from e. g., perceptual tracking. In perceptual tracking a bodily movement is executed in the process of following the movement executed by the other, and so e.g., the other's head movement may be duplicated by the self as part of the perception of other's mobile body. Such duplication in perception is, however, structurally different from imitation, where the self reenacts other's movement with the body proper *after* having perceived it.⁷ This split between perception and action is especially manifest in young infants whose poor motor mastery of the body proper prevents them from mimicking other's movements with the same speed and ease that typifies normal mature behavior; young infants not only imitate but gradually learn to control and adjust their motor performance to the perception of others, and so are substantially 'slowed down' in the imitative process. The double structure of imitative activity might explain its turn-taking character, i.e., the fact that infants imitate better when adult's facial activity is alternated with intervals of inactivity, identified as the "burst/pause" structure, such that the adult interchanges the gesturing with a 'passive face' phase (Meltzoff and Moore, 1983; 1989). The period of facial demonstration would then correspond to the receptive phase, the passive face period would incite and give the infant time to react by producing the matching gesture in turn. To conclude, it seems that temporal delay is an element of non-deferred as well as deferred imitation, and that a time lapse between being exposed and reacting to the other follows from its structural character, as different from perceptual tracking. Is that to say that infants need to consult a representative content each time they

⁷ Piaget (1962) argued in fact that such perceptual tracking, where the infant is "tethered" to the adult during the display, accounted for the imitation of head movement in infants that occurred prior to 8 months old. Piaget believed that perceptual tracking provided developmental precursors of later forms of imitation, such as facial imitation, which do not involve tethering (e.g., imitation of tongue protrusion cannot rely on the perceptual tracking of tongue protrusion, which involves ocular movements only). However, Meltzoff and Moore argue (1989), if facial imitation occurs from age zero and if infants can imitate while the adult maintains a passive face, no ground to argue that perceptual tethering is a necessary precursor of imitation remains.

shift from perception to performance, and guide their active response by an internal copy of the movement they perceived in the more or less distant past? The underlying assumption here is that the only valid memory model is representational - a point that is subject to debate.⁸ Incidentally, only simultaneous imitation would qualify as non-representational, but the possibility of such simultaneous imitation is excluded from the start by the structural character of imitative activity, in distinction from perceptual tracking.

Seeing and being seen

The theory of mind model for the so-called 'invisible' imitation is further problematized by means of a phenomenological analysis of facial embodiment. In what follows, I will argue that the awareness of the face proper meets neither of the two conditions for postulating the presence of (primitive) mental states which supposedly function as precursors of mind in young infants: it is neither exclusively *internal* nor *private*. Melzoff and Gopnik follow "common-sense psychology" and adopt its double requirement of interiority and privacy for the mind theory: "mental states are located inside the skin (or the head or the body), while physical objects, including the bodies of others, are located outside it." (1993, p. 339). These internal states are "private experiences," which cannot be "publicly observable." They are defined therefore as invisible sensations confined to the interiority of subjective life, which could only be accessed in the first person mode. Yet does the sensory awareness of the face proper in 'invisible' imitation really support this idea of an invisible subject residing in a visible body?

It does not, as long as it is understood that 'unseen' does not equal 'invisible' i.e., existing independently of the visual register. Consider first the twofold function of proprioceptive feedback of the body proper. As Gallagher and Meltzoff note, proprioception "consists of nonconscious, physiological information that updates the body with respect to posture and movement." (1996, p. 223). This information allows one to automatically co-ordinate posture and movement

⁸ An alternative memory model is found in the lectures on time consciousness by Husserl (1991). Husserl argued that a purely representational account of memory cannot explain how we experience an event as belonging to the past: if the past appeared as no more than the image of the past apprehended in the present, then it would be impossible to explain how this representation can retain the character of pastness. Rather than simply representing an object from the past in the present, consciousness reproduces the anterior perception of that object. It is only insofar as the present act of consciousness implicates the elapsed perceptual consciousness that the temporal distance between the present and the past is possible. The Husserlian conception of memory relies therefore not on the representation of the past object but on the reproduction of past perception.

without the need to have perceptual awareness of the body proper.⁹ Proprioceptive feedback includes also proprioceptive awareness, i.e., “a felt experience of the bodily position,” such that one knows where a given bodily part is located without having to monitor it visually. This latter element is not, however, independent of perception: the awareness of the location of bodily organs is a constituting element of the perceptual aspect of the body image;¹⁰ as such, it stands for a primitive aspect belonging to one’s awareness of the bodily exterior and cannot be confined to the bodily interior and defined as an internal state. The dual proprioceptive function of the body/face proper thus blurs the absolute distinction between interiority and exteriority, and it implies further that the cross-modal translation between vision and feeling in facial mimicry is not a transfer from a visible exterior (face of the other) to an invisible interior (face proper) i.e., to an exclusively motor non-perceptual proprioceptive information. Matching the facial gesture seen with the facial gesture felt is thus not a question of bridging the gap between visible and invisible experiences, the latter being precursors of mental states (Meltzoff and Gopnik 1993, p. 340). If proprioception is both motor and perceptual, then the cross-modal transfer from the face of the other to the face proper involves both a transfer within the perceptual system, between vision and perceptual proprioceptive awareness of the face proper, and a transfer between the perceptual system (including vision and proprioceptive awareness) and the motor system (proprioceptive information).¹¹ The cross-modal transfer is thus a process of both inter-corporeal and intra-corporeal communication.

One wonders indeed, how would the infant ever map the visible countenance of the other onto her own face and know that the face proper has an exterior that

⁹ As such it plays a crucial role in the (non-perceptual) body-schema system, whose innate presence facilitates neonate imitation.

¹⁰ For detailed conceptual clarification of the distinction between body-schema and body-image, see Gallagher 1986 and 1995.

¹¹ “There are two interrelated processes involved here: (a) crossmodal communication between vision and proprioceptive awareness (PA); and (b) communication between the perceptual system (which includes vision and PA) and proprioceptive information (PI). On the physiological level PI and PA depend on the same proprioceptors, and in some cases the same central neural structures, which supply the information necessary for both the automatic governing of movement and the perceptual sensation of one’s own movements (Phillips, 1985). Since PI and PA depend on the same physiological mechanisms it would not seem unreasonable to suggest an immediate two-way connection or interactive co-ordination between proprioceptive information, updating motor action at the level of the body schema, and proprioceptive awareness, as a perceptual element of the body image. And since PA and vision are intermodally linked, then there is also a link between vision and PI, or more generally between sensory/perceptual and motor activities. In the case of imitation the subject who is intentionally imitating depends on both PA and PI. What she sees gets translated into a proprioceptive awareness of her own relevant body parts; and PI allows her to move those parts so that her proprioceptive awareness matches up to what she sees.” (Gallagher and Meltzoff 1996, p. 224).

‘looks like’ the other’s face if her experience of the face proper was exclusively motor? The parallel of similitude between self and other suggests not only that the infant knows that the other looks ‘like me’ but also that ‘I look like’ the other. The primitive aspect of the body image in facial awareness enables this bi-directional visual analogy between the face proper and the face of the other to be established. However, insofar as the (primitive) body image is an element of inter-subjective relations, it may also be affected and enhanced by others during infantile imitation (see e.g., Gallagher and Cole, 1995, p. 373). Specifically, as I shall argue below, being seen by others in this process of face-to-face interaction provides an indirect experience of one’s visible facial exterior in a third-person mode. This argument supports the claim that facial awareness developed in ‘invisible’ imitation is not exclusively internal and private, but includes the sense of one’s facial exterior as an element of public relations with others as well.

By bringing this element of facial visibility to others into focus, the inter-personal character of imitative activity is underscored. Facial imitation would then not be a solitary process of arriving at a closest possible match between self’s motor experience and an internalized representation of the other’s exterior, but an inter-personal process where seeing the other’s face and being seen by the other dynamically interrelate. Meltzoff points to this inter-personal dynamic when he notes that infantile imitation has the form of social mirroring wherein the other encourages and discourages certain facial expressions, thus actively participating in infant’s building up a repertoire of facial expressions acceptable in a given culture.¹² Infantile imitation is not a process reducible to purely cognitive mirroring, with the other supplying the missing visual information about an unseen body part. If the other played exclusively the role of a ‘cognitive mirror,’ then she would remain functionally identical to the physical instrument of the mirror by means of which the self can learn what the unseen body proper looks like. Yet the other intervenes in infantile facial performance by directing the gaze at the infant and conveying an affective, positive (loving, approving) or negative (questioning, disapproving) feedback in regard to infant’s visible countenance. Even when the “target gesture [is] no longer perceptually present” (Meltzoff, 1990a, p. 16), as in the example of alternation between a demonstration period and a passive face pose (burst/pause structure), still the other does not

¹² Meltzoff states that “social mirroring is a unique and important constituent of early enculturation, because a social mirror (unlike a physical mirror) is both *selective* and *interpretative* in its reflections. Parents, as social mirrors, provide “creative reflections” to their infants, reflections that capture aspects of the infant’s activity but then go on beyond it to read intentions and goals to that behavior. ... Likewise, selected actions, especially those that are potentially meaningful in the culture, will be reflected back more often than others (Bruner 1975, 1982).” (Meltzoff, 1990, p. 158-159).

become absent *per se* from the imitating infant's field of experience once his facial display is "absent" (e.g., Meltzoff and Gopnik 1993, p. 341), and it is in the perceptual presence of the other that the infant reenacts the perceived gesture. Rather than define the alternation between demonstration period and passive face pose in terms of presence and absence of the perceptual target, which confines the role played by the other in imitation to providing facial models for the infant, we can define it in terms of interplay between seeing the other and being seen by the other, where the other is not only perceived but also perceiving. The imitative engagement between self and other is then not terminated once the other's face turns neutral; the passive face phase is as much an integral element of the imitative exchange as the active one is. This interplay between seeing the other and being seen by the other accounts for the social significance of the alternating turn-taking character of the imitative exchange referred to by Meltzoff and Moore.¹³ For it is not enough to say that when "an infant perceives a human adult acting, then stopping, acting, then stopping, this may motivate the infant to action rather than mere visual fixation" (Meltzoff and Moore 1983, p. 707). It needs to be added that during the pause in the adult's activity, the self-other exchange continues on the level of the gaze and that the infant's deferred display is a response to the other who looks at the infant and whose act of looking the infant fully registers. After all, the infant can detect the other's gaze directed at her and can feel to be the terminus of that gaze at a very early age.¹⁴

This experience of being seen allows the infant to develop an indirect sense of the facial exterior proper as visible to the other, even though occluded from her own view. The visual sense of face proper gained therein does not have a representational character since it does not rely on a visual content or featural information about the countenance to be consulted by the self but on being visible to others as an object under their gaze. Phenomenological analysis of the effects of the gaze can be found e.g., in the writings of Sartre (1956). Following Sartre, being exposed to the gaze of the other produces a powerful affective reaction in the self and is a source of the discovery of the body proper as an object visible to the other. Sartre's analysis of the gaze has been criticized for being essentially negative. The affective reaction to the other's gaze is defined as shame and humiliation before the other, and so it excludes the possibility of a positive experience of the gaze of the other, which would provide a source of self-discovery

¹³ As Meltzoff and Moore admit, this social significance "may be important in eliciting imitation" and may account for its turn-taking quality (1983, p. 707).

¹⁴ Following Baron-Cohen 1995, the eye-direction detector (EDD) is one of the mechanisms that allows the infant to recognize where the other is looking, for example that the other is looking at her (the infant). This mechanism participates in establishing early self-other relations.

rather than of self-alienation.¹⁵ As a matter of fact Sartre defines the dynamic of the gaze in terms of an objectifying potential which deprives the self of the ability to freely project itself into the world and freezes the self into a mundane thing. However, despite its pervasively negative formulation, Sartre's analysis of the gaze provides an important insight concerning the necessary mediation of the experience of the visibility of the body proper by the other person. In the experience of being seen, the visibility of the body proper becomes fulfilled by the other's gaze, while it is given to the self in an empty fashion (*d vide*). Under the gaze, I realize that "I exist for myself as a body known by the Other" (Sartre 1956, p. 351). The experience of the gaze as described by Sartre supports therefore the thesis that the unseen exterior of the body proper acquires visual significance indirectly through the exposure to other seers. As such, it provides ground for the argument that the sensory awareness of the face in 'invisible' imitation is not visually neutral, but that the self gains the sense of its face as manifest in the visible public world through face-to-face interaction with others. Hence it is neither the representation of the face in an external mirror image nor an internalized mental representation of other's face but the event of being seen by others in the very *locus* of the face proper that contributes to building up the sense of facial visibility proper by endowing the infant with a non-representational facial exterior.

Molyneux babies and blindness

There is no room and supposedly no need to have such a sensory awareness of facial exterior proper in the AIM model of infantile imitation designed by Meltzoff et al. Interestingly enough, however, the AIM model for imitation of facial gestures by sighted infants is largely inspired by the dilemma raised by the seventeenth century philosopher William Molyneux, which concerns congenitally blind subjects. Molyneux wondered whether a congenitally blind person, who can distinguish by touch between a cube and a sphere, would be able to distinguish and identify them through vision as well, if she were to recover sight. The issue at stake in this question is whether an inter-modal translation between the visual and the tactile spheres requires learning and experience or whether it is operated directly by those subjects who have tactile and newly visual sensibility (such as a sight recovery patient). Molyneux, as well as Locke

¹⁵ K. Wider (1999) criticized Sartre on that ground and discussed infantile imitation as a phenomenon that testifies to the possibility of a positive experience of the gaze as a source of self-discovery.

and Berkeley, believed that the connection between visible and tactile realms had to be developed and that a congenitally blind person would fail to make it upon recovering sight.¹⁶

Contrary to that view, Meltzoff proposes that the ability to make an inter-modal transfer between tactility and vision is innate. Special experiments were designed to corroborate that view (Meltzoff and Borton 1979): young infants (26 to 33 days old) were made to orally explore two different kinds of pacifiers without being able to see them. Half of the pacifiers used in the experiment had the spherical part that is inserted in the mouth covered with rubber nubs, the other half had a smooth surface. Care was taken that the infants did not see which pacifier they explored tactually. In the second part of the experiment, the infants were shown both pacifiers, and the time of their visual fixating both shapes was measured. The result of the experiment was positive: a significant majority (24 out of 32) "fixated the shape matching the tactual stimulus longer than the non-matching shape" (Meltzoff and Borton, 1979, p. 403). The infants therefore confirmed the possibility of making a direct inter-modal transfer from tactility to vision. Yet does that imply that they answered the Molyneux question in the positive as well?

The issue hangs on whether or not sighted infants can be treated on a par with newly-sighted adults. Meltzoff believes drawing such a parallel is valid: "Like a blind man, a newborn infant has not visually inspected objects and has not had a chance to associate visual and tactual experiences of the same object." (1993, p. 219). Due to lack of visual experience and of associative experience between tactility and vision, young sighted infants do not appear therefore to differ substantially from subjects whose life-long experience has been predominantly tactile and aural prior to the recovery of vision. For both sight is a novelty, and with (close to) null visual experience, a young infantile self and a newly sighted self seem functionally equivalent to a *tabula rasa*. One can therefore apply the Molyneux question to the imitation studies and inquire whether a blind person who can perform facial movements, such as mouth opening and closing, would be able to imitate those gestures were he to recover sight and see another person in front of him perform the very same facial movements (Meltzoff 1993, p. 220). Molyneux would answer such a hypothetical question negatively, and argue that there is no ground for a newly-sighted person to make the direct

¹⁶ Molyneux posed this question to the philosopher John Locke; Locke attended to this problem in his 1690 *Essay Concerning Human Understanding*, and gave a negative answer. George Berkeley examined the issue in more detail in his 1709 *A New Theory of Vision*, where he concluded that there was no necessary connection between sight and touch, and that the connection had to be developed through experience.

transfer from the visual spectacle of the other's body to the movements of the body proper, from the facial gesture as seen and as felt. Molyneux would thus have to exclude the possibility of infantile facial imitation as well: the infant would be just as incapable of making the inter-modal transition from the visible other to the 'invisible' self as a newly sighted person would be. However, Meltzoff argues, if neonate facial imitation is possible - and there is ample evidence that it is, then the transfer between tactility and vision can be operated both by individuals who have just recovered sight and by young sighted infants who have never seen the face proper, since it does not require learning and experience but is dependent on an innately present inter-modal matching mechanism.

The question remains however whether the Molyneux dilemma applies directly to infantile imitation studies, specifically whether subjects who were born blind and recovered sight in their adulthood can be treated on a par with young sighted subjects. This procedure glosses over the fact that blindness leads to developing a set of predominantly tactile habits which do not automatically translate into visual strategies upon recovery of sight. Numerous studies on the subject demonstrate that sight recovery patients have trouble making the connection between the world they have habitually explored and manipulated through touch and the newly discovered world of vision. They often cling to their 'tactile' habits in their everyday life, and do not automatically correct them with visual information at their disposal.¹⁷ The development of such fixed sensory habits puts pressure on the assumption implicit in the inter-modal matching model that a sense, such as touch, is a modality in which a sense-neutral supra-modal representation is cast and which by definition translates directly into another sense modality, such as vision, irrespectively of whether or not these sensory (and motor) capacities have been or can be actually exercised during a person's lifetime.¹⁸ The overwhelming evidence that the ability to make the transfer between the visible and the felt might be innate does not exclude the possibility of it being affected by lived experience, such that a lack of sight would de facto prevent the individual from making the inter-modal transfer between the visible and the tactile and would hinder the making of the transfer upon recovery of sight. The inter-modal transfer would then be explicable not only in terms of sense modalities but also of sensory habits established during the person's lifetime.

More pertinent for the purpose of the present discussion of facial embodiment, however, is the question whether the experience of face proper in blind and sighted subjects can be treated on a par. They can be, only as long as it is valid to identify

¹⁷ See e. g. case histories by Gregory and Wallace (1963), Valvo (1971) and Sacks (1995).

¹⁸ Meltzoff and Moore contend that sensory deficits such as blindness can be compensated for as long as the central supramodal representation system is not compromised (1997, p. 189).

lack of visual perception of face proper due to bodily constitution, i.e., the fact that a sighted subject cannot see her face, even though she could see its mirror reflection and does have visual perception of other parts of her body and of other bodies, with the lack of visual perception of face proper on account of blindness i.e., total deficiency of sight. 'Invisible' imitation would then comprise the same 'invisible' quality of the face proper for both the sighted and the blind, even though imitating infants are not 'blind' to their face due to an overall incapacity to see, and their 'invisible' face is not coupled with an invisible world. The difference between the blind and the sighted would then equal the difference in scope between total and partial blindness and between total and partial invisibility of the body proper, with the facial invisibility being shared by the blind and the sighted. The difference regarding facial embodiment in the blind and the sighted appears however not to be just in scope but rather in kind.

As I have argued, sighted infants develop a sense of having a facial exterior through their exposure to other seers. The moments of seeing the other display facial gestures and of being seen by the other are correlated during this face-to-face encounter. The experience of being seen is an integral part of the exercise of sight in 'invisible' imitation, where the infant not only registers the facial spectacle on the face of the other but also reads clues about the facial exterior proper from the gaze of the other and develops the sense of being visible in a third-person mode. Being under the gaze thus plays a constructive role in the making of the transfer between the face of the other and the face proper in 'invisible' imitation. If this experience of visual passivity in having one's bodily exterior exposed to other gazes is an integral part of being sighted, then it is excluded from the range of possible experience of persons who lack sight. The blind do not simply lack the ability to see, they also lack the ability to experience being seen, to track the direction of foreign gazes upon their bodies and faces. Lack or loss of sight is thus double in that it affects not only the access to the visible world but also to the visible body proper. It appears therefore that the difference of facial embodiment between the sighted and the blind is not only a matter of of scope between partial and total blindness but also a matter of of kind between a visually neutral and visually significant face. Even though young sighted infants' visual experience might be so minimal that it approximates the *de facto* lack of visual experience in newly sighted persons, still that does not justify using the case of the congenitally blind adult as a paradigm for developing a universal model of inter-modal matching and applying it to the phenomenon of facial imitation. This procedure of building universal models on the basis of the particular case of sight deficiency is misleading in that it neglects the importance of being seen, which is an element of the exercise of sight and which the blind do not have, for developing the visible facial exterior proper in the interaction with others. It suggests that facial embodiment proper is by definition

visually neutral, whether or not one disposes of sight and can engage with others through vision, and so provides ground for positing an invisible mental realm. However, as the narratives of the blind reveal, there is an important difference in the experience of the face proper between the sighted and the blind.

Consider the following observation from Hull, a professor of religious education, who documented the years following his loss of sight in a striking personal diary:¹⁹

Nearly every time I smile, I am aware of it ...aware of the muscular effort: not that my smiles have become more forced...but it has become more or less a conscious effort. It must be because there is no reinforcement ... no returning smile ...like sending off dead letters... (Cole 1998, p. 30)

Another observation on the experience of the smile from Peter White, a radio and TV journalist, who went blind as a young baby:

I have always been conscious of the smile. A smile is a physical entity to a blind person because of the sensation that it generates inside yourself. It's almost in the throat, a bubbly feeling ... You can feel your face twist and certain muscles relax so you know intellectually that this changes the shape of your face. (Cole 1998, p. 15)

Striking in these narratives of late as well as early onset blind persons is the fact that they describe a facial gesture such as the smile in terms of a muscular phenomenon confined to the body proper, an internal sensation resulting from facial contractions, whose external appearance and possible effect on others is either bracketed (“like sending off dead letters”) or inferred by a conscious reflective effort (“you know intellectually that this changes the shape of your face”). Such internalization of facial gestures in the blind is not a phenomenon that automatically extends to sighted subjects; Hull, who experienced both sight and blindness (unlike White, who has no distinct recollection of seeing), lives it as a dramatic change in his relations with his “significant others”: he can no longer facially interact with his wife and children, not simply because he can no longer see their faces, but also because he can no longer know whether or not the facial gestures he makes reach their destination. The effect of the smile on the other has been bracketed from his field of possible experience as he can no longer read non-vocal self-referential clues from the other, and only the corporeal source of the facial gesture provides its feedback.²⁰ Hence, even though his

¹⁹ Published under the title *Touching the Rock* in 1990. I refer here to J. Cole's discussion of his and other cases of blindness from *About Face* (1998).

²⁰ Hull can still read clues from others' voice if they speak, but fails to read them from others' non-vocal behaviour if they are silent.

muscular apparatus has not been affected, Hull feels “less connected and expressive in his face” after the loss of vision. Facial expressivity does not therefore seem reducible to localized muscular contractions but rather is part of visual communication with others who respond to one’s expressive face and who provide a looping feedback. If Hull feels the weight of the smile, it is because his smile no longer extends into a social exchange between self and other, no longer circulates in the public space of vision. The loss of sight thus turns the face proper into an ‘invisible’ entity - Hull feared losing his faciality together with vision, he felt the horror of becoming faceless once he was out of the visual interplay with other seers (Cole 1998, p. 30).²¹

The loss of facial expressivity in late onset blindness underscores the fundamentally social character of facial expressions in sighted subjects whose facial expressions exist in a visual continuum with other persons’ and whose exercise is not confined to proprioceptive sensations. Surely not all facial gestures function as means of visually engaging with others; the function of gestures is not limited to interpersonal communication but involves a cognitive aspect as well where the gesture serves to accomplish thought. Nor can the function of a smile be reduced to its social function - the smile can also be an expression of subjective pleasure, and the congenitally blind are capable of such enjoyment smiles even though they have difficulties with social smiles. It is not my intention to suggest that facial gestures serve an exclusively communicative function; however, insofar as the primary concern of this essay is the relation between self and other established in facial mimicry, it is this social function of facial gestures and the consequences of interaction with others for facial embodiment proper that I am inquiring about. The case of blindness is instructive in that regard, because it makes clear that this social dimension of facial embodiment is neutralized in vision deficiency, with facial gestures becoming reduced to their proprioceptive sense. If such a reduction accompanies the loss of sight, then one can infer that a sighted person’s sense of facial expressions proper must *exceed* the sheer proprioceptive feedback and involve a sensory awareness of a visually significant and publicly manifest facial exterior as well (i.e., that the face proper in sighted subjects is not only an element of the body-schema but also of the body-image, even though it is unseen). One cannot therefore conflate the sensory

²¹ The dimension of visible bodily expressivity which a late onset blind person loses, a person born blind has to superimpose onto her bodily behavior. Hence David Blunkett, a distinguished politician who is congenitally blind, comments on the difficulties he encounters while being interviewed on TV: absorbed by the questions and answers, he gives an austere and cold impression as he ‘forgets’ that he is viewed by the spectators. “You forget that automatically people are viewing you, and as you’ve grown up without that you have to think of it and superimpose some facial reaction onto the rest of your thoughts.” (Cole 1998, p. 20).

awareness of the face proper in the sighted and the blind. The internalized non-visual sense of the face proper which typifies the facial embodiment in a blind person does not apply to facial imitation performed by sighted infants and so does not support a universally applicable hypothesis of a mind confined to self's interior life and, as such, exclusively private. The face-to-face interaction with others in imitation involves an awareness of the face proper as having an exterior as well as being internally felt, of being publicly manifest and not exclusively private, and it does not therefore provide precursors of mental states or support a theory of mind approach. Facial interaction in infantile mimicry seems to better support the theory of primary intersubjectivity, i.e., an embodied practice of communicating with others through manifest expressive behavior, with no need to postulate hidden mental states.²²

Furthermore, the mirroring facial relation established between self and other does not appear to be simply a universally present consequence of an innate inter-modal matching mechanism but also a practice dependent on the ability to exercise vision, and affected by its lack. The active engagement with others exhibited in infantile facial imitation might not apply to infants born blind - studies by Hobson et al. provide evidence of a substantially lesser willingness to interact with others in the blind than in sighted infants. The general apathy and asociality of blind infants, which frustrate parental efforts to establish a firm, focused relation with them, provide evidence for "autistic-like" features in the non-sighted children according to the authors (Brown, Hobson and Lee, 1997). The diminished engagement with others is a concomitant of restricted perceptual experience, specifically of a limited notion of space, which is not established through visual perception but gained through the vibration of sound. As the ability to locate and identify others through hearing is a later development, a blind child has more problems locating and identifying people than a sighted one does.²³ The blind infant is then less aware and stimulated by others in her proximity than a sighted neonate, who receives affective signals from surrounding others

²² If interaction with others is an embodied practice, there is no need to employ a theoretical stance in order to relate to others, as theory of mind advocates suggest. Simulating or theorizing about another's mental states would then not be primary ways of interacting with other persons, even though simulation and theoretical interpretation would in some cases "explain a very narrow and specialized set of cognitive processes that we sometimes use to relate to others," such as explanation and prediction based on mental contents (Gallagher, 2001).

²³ Sandler and Hobson: "In our own observations, we noticed that the quality of experience given by sound alone did not appear to give blind children the ability to predict their mother's whereabouts. They did not learn to track their mother according to the sounds she was making. So for the young blind children, mother remained more fragmented in their inner representations than for the sighted children - and for longer." (2001, p. 213).

through the gaze, the smiling face, etc., is. If others are not spatially present to a blind infant, because hearing is late in constituting space as compared to vision, they are perceptually absent once they are removed from the infant's direct reach through touch and so no incentive for communicative engagement with others arises in the environment of a blind infant. Unable to communicate with others visually, the infant cannot execute the inter-modal transfer between perceptual others and the body proper, and so cannot put in motion the dyadic face-to-face exchange that typifies facial mimicry. If this face-to-face exchange operative in infantile imitation is an early expression of primary intersubjective relating, the entire social dynamic may be severely affected by the lack of imitative activity in blind infants (Sandler and Hobson speak of "a seriously impoverished quality of reciprocal emotional engagement" in blind infants (2001, p. 211)).²⁴ In that case it is difficult to uphold the view that a uniform representational supramodal structure, easily transferable from one sense to another and unaffected by the transfer, regulates self-other relations.

Concluding remarks

I have argued that infantile imitation studies are a significant advancement over mirror stage theory in the problematic of self-other relations in that they demonstrate that intersubjective relating is not a late development but a capacity present from age zero. The neonate need not pass through a solitary stage of visual self-discovery by contemplating its body-image in the instrument of the mirror in order to visually engage with others; it is in the direct interaction with her fellow beings that the infant realizes that self and others look alike. In facial mimicry, the infant uses the other's mobile face as a model with which to guide her own facial movements and so establishes a parallel of similitude between the visible face of the other and the unseen yet visually significant face proper. Meltzoff et al. interpret this interpersonal process as active inter-modal matching of visible and felt gestures, mediated by internal representations of the other's face which the infant strives to match with the proprioceptive feedback from the face proper. I have argued, however, that this representational model deprives the process of facial mimicry of its inherent inter-subjective significance: infantile mimicry appears as a solitary achievement of motor mastery guided by subjective mental contents, with the other playing no constructive role in the imitative process. The structural character of

²⁴ This is in agreement with Gallagher's claim that embodied intersubjectivity is primary not only in developmental terms, but also "primary across all face-to-face intersubjective experiences" (2001, p. 91).

self-other relation does not therefore substantially change over the one implicit in the mirror stage theory: visual self-discovery is accomplished by a solitary agent and others do not actively intervene in establishing the parallel of similitude between self and non-self. I have argued that the face-to-face exchange in infantile mimicry involves two agents rather than one and that it includes not only the active performance of looking at the other's face and using the visual facial target as model for bodily behavior proper but also the passivity of being looked at by the other in the face proper, which endows the self with a non-representational sense of facial exterior visible to the other's gaze and which facilitates the parallel of similitude between self and other.

The transfer from the other's face to the face proper includes therefore not only an inter-modal translation between vision and feeling, but also an intra-modal exchange between the active and passive modalities of vision. Merleau-Ponty (1968) termed this intra-modal passive/active dynamic *sensible reversibility* and derived it from the embodied character of the senses. The sensible reversal between the active and passive forms of seeing and being seen follows from the fact that a living body not only emits a gaze but is itself visible and subject to other gazes. In the case of vision, unlike in the case of touch, the reversal between the sensible activity and passivity is not accomplished directly within the sensing organ (the eye cannot see itself and the visual sensation is not localized in the eye) but rather on the occasion of an encounter with another seer who directs his gaze upon the seeing self and provides the self with an experience of visual passivity.²⁵ Henceforth, even though the senses are by definition reversible due to their embodied character, it is the exposure to the other that provides the self with an experience of visibility proper. The discovery of the visible facial exterior and establishment of the parallel of similitude between face proper and the face of the other in infantile imitation belongs to this inter-personal dynamic of vision and is an element of the double experience of seeing and being seen. Specifically, it includes the reversal between seeing the other perform a facial gesture and being seen by the other perform this gesture.

The constructive role played by the other in facial imitation implies that the lived experience of facial embodiment proper exceeds proprioceptive feedback and includes a visually significant exterior as an element of public relations with others as well. Hence, no ground is provided for an invisible mental subject, defined in terms of interiority and privacy, by the imitative face-to-face exchange. It appears in fact that this mind postulate is inspired primarily by a Cartesian presupposition that the self must be defined in terms of a mental entity in a difficult

²⁵ On the distinction between vision and touch in relation to the body, see e.g. Dastur 2000, pp. 39-40.

inter-relation with the body and with others, irrespectively of phenomenological and scientific evidence. Phenomenological philosophers have constructively criticized this mind/body dualism pervasive in contemporary scientific research. Specifically, the phenomenological contributions of Merleau-Ponty and Sartre referred to above allow us to correct the Cartesian picture by bringing in the element of sensible passivity which testifies conjointly to the corporeal character of the imitative process (senses include an element of passivity insofar as they belong to the living body) and to its inter-personal or inter-corporeal dynamic structure (the experience of passivity is an effect of being exposed to the other). The phenomenological concepts of sensible reversibility and the gaze seem therefore to provide more appropriate conceptual tools for theorizing the self-other relation established in infantile mimicry than those derived from Cartesianism (mind, mental representation). Infantile imitation studies provide then a concrete opportunity for pursuing a constructive dialogue between experimental psychologists and phenomenological philosophers with regard to the problematic of inter-personal relations and embodiment.

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