Whatever Next and Close to my Self – The Transparent Senses and the ‘Second Skin’: Implications for the Case of Depersonalisation

Abstract

In his seminal paper ‘Whatever next? Predictive brains, situated agents, and the future of cognitive science’ Andy Clark (2013) argued that the brain’s job is to predict whatever information is coming ‘next’ on the basis of prior inputs. This is because the organism’s survival is key to biological agents such as humans. Survival however crucially depends on rapid and accurate information processing of what is happening in the here and now. In this paper we suggest that term ‘next’ in Clark’s seminal formulation must include not only the temporal dimension (i.e. what is perceived *now*); but (ii) also the spatial dimension (i.e. what is perceived *here* or next-to-my-body). This is because ‘here’ and ‘now’ are like the two sides of the same coin when it comes to processing survival relevant perceptual information. We argue that perceptual processing of proximal sensory inputs has a key impact on the organism’s survival. Specifically, we focus on tactile experiences mediated by the skin and what we will call the ‘extended skin’ or ‘second skin’, that is immediate objects/materials that envelop closely our skin, namely clothes. One relatively overlooked aspect of our experiences is that humans in modern societies spend most of their lives having their bodies closely enveloped by materials/textile. Following the seminal ‘extended mind’ thesis (Clark & Chalmers 1998), we argue that these materials may be conceived as a ‘second skin’ or ‘extended skin’ that underwrite what we will call here ‘extended body-image’ and ‘extended body-schema’ (cf. Gallagher 2005). Contrary to the standard approach that views the skin (and tactile experiences) as a mere border separating the self and world, here we propose that the skin (and its extended version, ‘the second skin’, i.e. the clothes) simultaneously and inherently distinguish *and* connect the bodily self to its environment. Hence these proximal and pervasive tactile experiences be viewed as a ‘transparent bridge’ intrinsically relating and facilitating exchanges between the self and the physical and social world. We conclude with potential implications of this observation for the case of Depersonalisation Disorder, a condition that makes people feel estranged and detached from their self, body and the world.

Introduction

In daily life we experience ourselves as constantly immersed in an ongoing flow of sensory signals (smells, sounds, images, etc.) emerging from both inside and outside our bodies. These sensations and perceptions scaffold both (a) a *sense of self*, i.e. the subjective first-personal ‘I’ or ‘self’, bound to my body and distinct from the world and others (see Qin et al. 2020 for a recent review). And (b) a *sense of presence*, i.e. the feeling that I am immersed and in direct touch with a real world *here and now* (Seth et al. 2011). Perceptual experiences are traditionally regarded as the fundamental point of contact of an experiencing subject with external, mind-independent world situated ‘out there’¹.

The past decades have witnessed an ‘embodied turn’ in examining perception from a situated, embodied and dynamic viewpoint. The body is not viewed anymore as a mere ‘material’ or ‘physical’ support system for transporting and fuelling the mind and brain. Rather minds and

¹ For example, Crane and French (2015) note that: “perceptual experience, in its character, involves the presentation (as) of ordinary mind-independent objects to a subject, and such objects are experienced as present or there such that the character of experience is immediately responsive to the character of its objects.”

brains are designed to support the maintenance and survival of a body within a wider and potentially threatening physical and social environment (Varela et al. 1991; Gallagher 2005; de Jaegher & di Paolo 2007; Thompson 2007). As Gibson famously argued, bodily perception and behaviour are intrinsically linked to the perception the environment’s structure and organisation² (Gibson 1979).

In line with this approach, recent work within the influential Predictive Processing (PP) theoretical framework suggested that biological agents such as humans are “pro-active survival-enabled prediction machines” (Clark 2013:1). In this view, the main function of perceptual experiences is ultimately geared towards self-preservation. The brain and mind’s main job is to optimally maintain the bodily homeostatic balance within the required limits for survival and reproduction purposes within a constantly changing and potentially threatening environment³ (Friston 2008; Hohwy 2013; Fotopoulou 2015; Seth & Tsakiris 2018).

Homeostasis refers to the organism’s need to maintain a stable internal environment despite fluctuating external environment and homeostatic regulation entails using feedback control mechanisms to keep sensed variables of the internal environment within ranges compatible with survival (Modell et al., 2015). To complete this difficult task, the human brain generates its own internal self- and world models by extracting statistical patterns of relevant information (Conant & Ashby 1970; Friston 2005; Friston and Stephan 2007). These self- and world-models are constructed moment-by-moment at various levels of the hierarchical processing (Clark 2013; Hohwy 2013).

In this view, perceptions are underpinned at the neural level by dynamically shifting generative models ‘predicting’ what is causing incoming sensory events, based on Bayesian probabilistic ‘guesses’ about the likely causes of any incoming sensory information (Friston 2008; Hohwy 2013; Fotopoulou 2015). Incoming sensory inputs are then contrasted or ‘matched’ against learned (or innate) patterns constituting what are called ‘predictions’. When a prediction does not match ongoing sensory input, then a ‘prediction error’ (PE) results, which may have the effect of updating the prediction.

A detailed overview of the PP literature, its advocates and opponents, lies beyond our scope here. In this paper we retain and build upon the key and largely noncontroversial idea that whatever we perceptually experience next (Clark 2013) is informed by and grounded in whatever we have perceived and hence experienced before.

Now, if our current perceptual experiences are indeed infused and structured by previous ‘priors’ or ‘expectations’, then it becomes crucial to understand not only what a perception is, but crucially how perceptual experiences unfold, dynamically, from a bottom-up developmental perspective. Indeed, in real life, human beings are not emerging as fully-fledged adults – like Athena famously emerged from Zeus’ head – but they gradually develop from cells to a human body within another human body (Ciaunica 2017; Fotopoulou & Tsakiris, 2017; Ciaunica & Crucianelli 2019; Martinez Quintero & de Jaegher 2020; Ciaunica et al. 2021.).

² “The supposedly separate realms of the subjective and the objective are actually only poles of attention. The dualism of observer and environment is unnecessary” (Gibson 1979, p.116).

³ We recently had the chance to see this hypothesis at work during the ongoing COVID-19 pandemic: many of us experienced major difficulties to focus on abstract tasks, our attention being constantly attracted to the concrete conditions that threatens our lives and those of our loved ones.

While standard accounts tacitly privileged a visuospatial and distal model of perception, there is growing interest in highlighting the inherent multisensory and proximal nature of perceptual experiences as they unfold throughout the lifespan (Noe 2004; Faivre et al. 2017; Ciaunica & Fotopoulou 2017; Fotopoulou & Tsakiris, 2017; Ciaunica & Crucianelli 2019; Seth & Tsakiris 2018; Barwitch 2020). The vision-biased model of perception is easily understandable insofar as healthy adults seem to be presented with a continuous visual field devoid of any phenomenological boundary between what is close and what is far (de Vignemont 2018). However, as de Vignemont (2018) rightfully notices, the perception of a snake next-to-my foot is essentially different from the perception of the moon in the sky in terms of survival outcome.

In this paper, we propose to shift the focus on the perceptual processing of proximal sensory inputs (literally ‘next-to-the-self’), and more specifically on touch which has a key impact on the organism’s survival. In line with seminal paper ‘Whatever next? Predictive brains, situated agents, and the future of cognitive science’ Andy Clark (2013), we suggest that term ‘next’ should be understood not only at the temporal scale (i.e. what is perceived in the upcoming second); but (ii) also from a spatial dimension (i.e. what is perceived literally next to or close-to-my-body). Endorsing a dynamic bottom-up viewpoint points us to the idea that touch, before vision, plays a fundamental role in constituting self- and world-models in early life and beyond (Fotopoulou & Tsakiris, 2017; Ciaunica & Crucianelli 2019). Indeed, as we will see shortly, humans have proximal and “direct sensible acquaintance” (W. James 1890) with others’ bodies (via skin-to-skin interactions) well before they meet others’ minds (via face-to-face and eye gaze interactions) (Ciaunica 2017; Ciaunica & Fotopoulou 2017; Ciaunica et al. 2021).

We argue that paradoxically, precisely because tactile proximal inputs are ubiquitous, under normal circumstances they tend to be ‘transparently’ processed ‘in the background’, typically unnoticed and taken for granted. However, the same way one cannot understand what a tree is and how it functions by looking at its visible components only (e.g., branches, leaves, trunk), one cannot understand the nature of perceptual experiences by ignoring its invisible and ‘transparent’ tactile and proximal roots.

We unpack these ideas below and we proceed as follows:

In Section 1 we define the notion of ‘transparency’ and we explore the phenomenological idea proximal sensory inputs (e.g., olfactory, proprioceptive, tactile, interoceptive) are blended to form a tacit “background existential orientation” (Ratcliffe 2008). Specifically, we focus on tactile experiences and suggest that precisely because tactile perception is so pervasive and yet so essential to our everyday life, that it forms a baseline and transparent experiential background.

Section 2 motivates the claim that tactile experiences may precede more sophisticated forms of detached and distal perceptual awareness – such as visuospatial perception (e.g. seeing an apple). Indeed, well before humans are able to recognize themselves in a mirror and to perceive themselves from a visuospatial distal perspective, they experience themselves and their surroundings via proximal senses. We review empirical developmental findings pointing to the key role of touch in constituting perceptual experiences in early life and beyond.

In section 3 we tackle a relatively overlooked aspect of our tactile experiences, namely the fact that with rare exceptions, humans in modern societies spend most of their lives having their bodies closely enveloped by clothes. We focus on tactile experiences that extend to the immediate objects/materials that envelop closely our skin. Following the seminal ‘extended mind’ thesis (Clark & Chalmers 1998; Kirchhoff & Kiverstein 2019), we argue that these materials may be conceived as a ‘second skin’ or ‘extended skin’ that underwrite what we will call here ‘extended’ body-image’ and ‘body-schema (cf. Gallagher 2005).

Finally, in section 4 we suggest that tactile experiences – mediated by the skin and the ‘extended skin’ – may be viewed as a ‘transparent bridge’ intrinsically relating and facilitating exchanges between the self and the physical and social world. We build upon the observation that the skin has an inherent dual function: it simultaneously separates and relates our bodily self to the physical and social world. Touch mediates indeed our self presence in the world. We thus hypothesise that close tactile engagements with the social and physical environment play a fundamental role in shaping both our sense of self and sense of presence or immersiveness in the world. We briefly discuss some potential implications of this observation for the case of Depersonalisation Disorder, a condition that makes people feel estranged and detached from their self, body and the world. We conclude with some potential implications of our hypotheses for designing bodily and interactive interventions aiming to alleviate the depersonalisation symptoms. If our hypotheses are correct, then it is paradoxically by inviting depersonalisation people to get closer to the world and others that they may start to get closer to their ‘lost’ self.

§1 Perceptual Awareness and the Transparent Experiential Background

Perceptual awareness is typically described as having a polarised subject-object structure whereby an experiencing subject perceives an ‘external’ world/object ‘out there’. Traditionally, it has been proposed that one becomes self-aware when one is able to perceive oneself as an object of one’s awareness, and to see oneself through others’ eyes (Carruthers 1996). For example, when I see myself in a mirror, I recognise myself as an individual distinct from the world and others. But also, I can see myself as others see me, from a third-person perspective.

However, as William James (1890) pointed out, the most fundamental way to get to know oneself is through feelings, not thought: “For this central part of the Self is *felt*... It is at any rate no *mere ens rationis*, cognized only in an intellectual way, and no mere summation of memories or mere sound of a word in our ears. It is something with which we also have *direct sensible acquaintance* ... when it is found, it is *felt*; just as the body is felt. (James 1890: 298-299 original italics; bold our emphasis).

Indeed, as phenomenological theorists rightly stressed, amongst the objects that an experiencing subject perceives in the world throughout her life, the body has a special status (Merleau-Ponty 1962). As Husserl famously wrote, the body is not just an object that is perceived but also that through which we perceive: “The Body [*Leib*] is, in the first place, the *medium of all perception*; it is the *organ of perception* and is *necessarily* involved in all perception” (Husserl, 1989, p.61). The body follows the experiential subject everywhere, like a shadow, for better and for worse.

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2 It has been proposed that all experiences include a “background existential orientation”
3 constituted by bodily feelings: “the feeling *is* the way in which one finds oneself in the world
4 and the way in which one finds oneself in the world participates in all experience, albeit as
5 something that is usually pre-reflectively taken for granted” (Ratcliffe 2008: p 140).
6

7 The idea of an existential bodily background has been highlighted in neuroscience research.
8 For example, Damasio writes:
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10 “I am postulating another variety of feeling which I suspect preceded the others in
11 evolution. I call it *background feeling* because it originates in ‘background’ body
12 states rather than in emotional states. It is not the Verdi of grand emotion, nor the
13 Stravinsky of intellectualized emotion but rather a minimalist in tone and beat, the
14 feeling of life itself, the sense of being”. (...) The background feeling is our image of
15 the body landscape when it is not shaken by emotion. (...) I submit that without them
16 the very core of your representation of self would be broken” (Damasio 1994, pp.150-
17 1, our italics).
18
19

20 It has been proposed that the lived body is the feeling body which remains tacitly, and one
21 could say ‘transparently’ in the background⁶. In the remainder of this paper, we build upon
22 the idea that these bodily feelings constitute a pervasive and ‘*transparent*’ experiential
23 background, that can be attended or altered, i.e. ‘broken’ (Fuchs 2005; Ciaunica et al. 2020).
24

25 Transparency, can be intuitively grasped via the ‘window’ metaphor: a clear and transparent
26 window glass or sliding door can give us the illusion of an unmediated access to the outside
27 world. However, although we subjectively feel that we are directly in touch with one’s inner
28 self and the outer world, in reality our experiences are *mediated* through certain states or
29 processes that are transparent, pervasive and tacitly taken for granted (Fuchs 2005; Ciaunica
30 et al. 2020).
31

32 The notion of “transparency” has been theoretically spelled out in different ways by different
33 theorists (Moore 1903; Harman 1997; Tye 1999; Metzinger 2003, 2004) and a detailed review
34 of these accounts⁷ lies beyond the scope of this paper. Here we restrict our focus on the
35 property of transparency of perceptual experiences. Take the following example: I am on a
36 street and I can turn my head left or right. Eventually, I turn my head left, and I realise that I
37 chose this direction, because I have perceived with the corner of my eye the label of a French
38 bistro. Suddenly I realise that I am hungry and the reason why I turned my head into that
39 direction is because my brain, concerned by my bodily survival, detected some relevant
40 background information, that is now brought forward, at the surface of my awareness.
41 Consequently, I engage in homeostatic self-regulatory behaviour and I walk towards the
42 bistro.
43

⁶ As Merleau-Ponty writes: “in so far as it sees or touches the world, my body can be neither seen nor touched. What prevents its ever being an object, ever being ‘completely constituted’ is that it is that by which there are objects. It is neither tangible nor visible in so far as it is that which sees and touches”. (Merleau-Ponty, 1962 :92)

⁷ For example, some theorists argue that while we typically have access only the mental representation’s intentional content (something in the world which it’s about) without noticing its non-intentional carrier properties (Moore 1903; Harman 1990; Tye 1999), the process itself of constructing inner representations can become available to our introspective attention. Whenever we consciously direct our attention introspectively inwards, so to speak, the transparent processing of mental representations (typically taken for granted and hence “invisible”) becomes “*opaque*”, that is, “visible” and available to our attention (cf. the window metaphor described above).

We restrict our focus on the property of transparency of experiences (and leave aside mental representations or processes). It is important to distinguish, in our view, between (a) what is non-conscious but can be in principle consciously attended (brought into the focus of the attention; e.g. the visual stimuli of a bistro label or the interoceptive signals of my hungriness); and (b) what is non-conscious and cannot be consciously attended *tout court* (e.g. the firing of my neurons while I perceive the French bistro). Only the former, but not the latter can be processed ‘transparently’ because only (a) but not (b) can be attended, and become ‘opaque’.

In what follows, we explore the idea that our tacit “background existential orientation” is essentially underpinned by proximal sensory inputs (e.g., olfactory, proprioceptive, tactile, interoceptive) which are blended to form an experiential ‘transparent’ background. These signals are so pervasive and yet so essential to our being in the world that they seem to form a baseline and taken for granted experience. Specifically, we focus on touch⁸ and tactile experiences for three interrelated main reasons. (1) First, touch is mediated by the skin, the oldest and widest organ in terms of dimensions and functions (Montagu, 1971; Field, 2001; see Gallace and Spence 2010 for a review). By providing the organism with the most primitive means to ‘meet’ and perceive the world, tactile experiences may constitute thereby the most ubiquitous and basic experiential background.

(2) Second, the skin mediates the boundary between the self and the outer world, and as such, tactile experiences display an inescapably dual ‘*touchant/touché*’ structure (Merleau-Ponty 1962). By gaining information about the world via touch, the subject inherently gains information about her ‘self’ too. Indeed, while proprioception, kinaesthesia and interoceptive of visceral inputs are phenomenologically inextricable components of the existential background feeling, tactile experiences because they play a special relational or dual role: ‘tactual perception’ (Ratcliffe 2013) is closely associated with or partly constituted by perception of one’s body: one cannot perceive the world tactually without perceiving oneself in the process. As Merleau-Ponty (1962, p.316) famously pointed out, whilst vision “presents us with a spectacle spread out before us at a distance”, in perceiving the world through touch, “I cannot forget in this case that it is through my body that I go to the world” (1962:316). By directly mediating the boundary between body and world, the skin inescapably distinguishes yet relates body and world, as the two faces of the same coin. As Martin notes (1992, 1993, 1995) tactile feelings can simultaneously be perceptions of body and/or of world.

(3) Last but importantly, touch plays a key exploratory and social bonding role, which confers it a sense of ‘closeness’: we touch things to make sure they are real and we touch people to make direct and close contact with them. As Fulkerson (2014) notes, what distinguishes tactual experience from the other senses is the fact that the former involves “exploratory binding”; it relies upon actively manipulating (and being manipulated by) the environment.

Up to now, we have motivated the claim that the body-world relationship mediated via tactile perception remains tacitly and ubiquitously in the background and the sense of self may be inseparable from this relationship.

⁸ We do not claim that touch is the most fundamental proximal sensory channel, rather we outline its special role as a relational sense par excellence.

In the next section we suggest that close tactile experiences may precede more sophisticated forms of detached and distal perceptual awareness – such as visuospatial perception (e.g. seeing an apple). Well before humans are able to recognize themselves in a mirror and to perceive themselves from a visuospatial distal perspective, they experience themselves via proximal senses, such as tactile experiences.

§ 2 Back to square one: the basic proximal senses

There is a growing consensus in philosophy, psychology and cognitive neuroscience that multisensory information about the body plays a central role in structuring our basic sense of self (Gallagher 2000; Blanke & Metzinger 2009). Specifically, the interplay and coupling between (a) exteroceptive (e.g. vision, audition) and (b) interoceptive senses (e.g. temperature, pain, cardiac signals, breath, etc.) is as key component of our sense of self (Park and Blanke 2019). It has been also argued that the basic experience of being a self is the result of an ongoing inferential process based on a generative model centred onto the bodily self (Seth 2013; Apps & Tsakiris 2013; Limanowski & Blankenburg 2013; Limanowski and Friston 2018, 2020; Hohwy 2013; 2020).

However, one basic yet overlooked aspect of current embodied and PP approaches in both philosophy and cognitive neuroscience is that brains (and minds), and human bodies, first develop *within* another human body. The most basic models of perceptions and actions emerge already *in utero*. (Ciaunica 2017; Ciaunica & Crucianelli 2019; Martinez Quintero & de Jaegher 2020). Crucially, while not all humans will have the experience of being pregnant or carrying a baby, the experience of *being carried and growing within another person's body* is universal⁹.

In the remainder of this section, we provide evidence illustrating that it is touch (and not vision) which is one of the first of our senses to develop, and affords us thereby with our most basic and earliest means of “meeting” and perceiving both the self and the external world (Ciaunica & Fotopoulou, 2017; Fotopoulou & Tsakiris 2017; Ciaunica et al. 2021).

In the womb, fetuses spend a significant amount of time in tactile exploration of the boundary between innervated and non-innervated regions (Piontelli 2014, Mori and Kuniyoshi 2010, Hata 2016). For example, fetuses frequently touch certain body areas, such as the lips, cheeks, ears, and parietal bone, creating a self-stimulatory pattern, which enhances innervation. Importantly, when the foetus touches the forehead, innervation increases and the boundary migrates (Piontelli 2014). This allows the foetus to move on in touching a new innervated boundary, and the cycle repeats until the whole body is fully innervated (Piontelli, 2010; Delafield-Butt & Gangopadhyay, 2013). Additionally, when the foetus touches itself, the placenta, or a co-twin, it develops different kinematic and tactile patterns emerge, that differ in pressure, acceleration and directedness (Hata 2016). Moreover, it has been shown that maternal touch of her own abdomen also increases arm, head, and mouthing movements in the foetus (Marx and Nagy 2013), and that maternal touch has more impact than maternal voice in the foetus' movements.

⁹ Throughout this paper we will use the terms ‘pregnant person’ and ‘mother’ interchangeably, irrespective of their self-identified gender.

Tactile interactions require the ‘toucher’ and ‘touched’ to be physically proximal, to ‘share’ the experience of touch (passive or active), and it is often accompanied by a cascade of other sensorial information, such as the smell of the other person, the sound of the tactile contact on the skin (think of the ‘noise’ made by a kiss); and temperature of the other body. Given the richness of information provided by tactile interactions, it has been hypothesised (Ciaunica & Fotopoulou, 2017; Fotopoulou & Tsakiris, 2017) that social touch might represent a fundamental step in the development of both self- and other-awareness, as well as self-other distinction (see McGlone et al. 2014 for a review).

Specifically, one type of pleasant touch, the so-called affective, or sensual touch (i.e. slow, caress-like touch mediated, among other, more classic tactile fibres, by the C Tactile afferent system, Löken et al., 2009; Kirsch et al., 2020) has been re-defined as an interoceptive¹⁰ modality since its primarily functional role seems to be to provide information about the homeostatic and emotional effects of touch, rather the properties of what or who is being touched. It has also been shown that the activation of these CT receptors on the skin may specifically relate to the positive consequences of interpersonal touch (see McGlone et al. 2007), such as reducing feelings of social exclusion (von Mohr et al., 2017), soothing pain (Krahe et al., 2016; von Mohr et al., 2018) and communicating social support (Kirsch et al., 2018). Indeed, related findings suggest that this system may be specialized not only for processing affective touch, but also specifically *social affective touch* from early on in life (see Morrison et al. 2010 for a review). Specifically, the foetus is entirely covered in fine hair (i.e. lanugo hairs), and it has been suggested that foetal movement in the amniotic fluid might directly stimulate CTs afferent, which are known to activate hypothalamus and insular cortex, promoting an anti-stress effect via release of oxytocin and stimulating the foetal growth (Bystrova, 2009).

A second key example of early sensorimotor coordination is self-touch and tactile perceptions. While a significant body of research focused on the effect of auditory inputs (such as maternal voice or music) on the foetal development, it is important to bear in mind that in the womb, the most developed sensory systems in foetuses are the tactile and olfactory ones, not the visual or auditory ones. This suggests that the most basic way to perceive oneself and the world are mediated through proximal modalities (Ciaunica & Fotopoulou 2017) such as touch, interoception and olfaction (Ciaunica & Crucianelli 2019).

After birth, infants receive constant and proximal tactile stimulations, which significantly reduces infant’s stress and increase positive affect (Stack & Muir, 1992; Bellieni et al., 2007). Affective touch is believed to play an important role in the creation and maintenance of social bonding¹¹ (Morrison et al 2010 for a review) and more recently to the sense of body ownership (Lloyd et al., 2013; van Stralen et al., 2014) and self-identity (Panagiotopoulou et al., 2017).

¹⁰ Interoception (the perception of bodily visceral signals) is taken to be uniquely related to the generation of subjective feelings, informing the organism regarding its levels of arousal and bodily needs (Craig 2009; Seth 2013). Even more importantly, and contrary to classic views of interoception as ‘the perception of the body from within’, the current notion of interoception is tightly linked to homeostasis. Within this framework, interoceptive signals are considered crucial in informing the organism regarding the homeostatic state of the body in relationship to experiences originating from both within the organism (e.g. cardiac and respiratory functions, digestion, hunger, thirst), or outside it (e.g. taste, smell, affective touch, pain).

¹¹ Substantial literature in the context of attachment formation also support the facilitating role of touch in establishing the social bond between infant and caregivers (Ainsworth, 1979; Weiss et al. 2000).

We can summarize the argumentative backbone developed so far as follows : if we grant the premise that the perception of incoming ‘whatever next’ (Clark 2013) sensory information emerge from the processing of ‘whatever before’, i.e. priors or ‘expectations’, then one needs to step back and have a closer look at how perception gets off the ground from the outset. If we endorse a bottom up developmental perspective, then empirical work points us to the idea that (discriminative and affective) tactile inputs play a fundamental role in constituting perceptual experiences in early life.

In the next section we turn our attention to the special relationship between touch, body and what is next-to-our-skin. We introduce the key notion of ‘the second skin’ or ‘extended skin’ and explore them in relation to materials situated close to our skin, i.e. our clothes. We claim that they constitute what one may call, following Gallagher (2005) ‘extended’ body-image and body-schema. We turn to this discussion now.

§ 3 Closer to our body - extending the transparency to the ‘second skin’

Clothes play a peculiar role in our bodily experiences. Textile are pervasive material objects enveloping closely our skin. They seem to be at the same time visible and invisible. Visible because they are tangible and on display on our bodies and the bodies of others. Invisible, because we tend to ‘forget’ them in the background and to process them ‘transparently’ as defined above. By mediating the boundaries between our bodies and the environment, clothes also seem to have an ambivalent role: they are simultaneously covering the intimacy of the bodily self, and sending social signals to the public eye about one’s self-image. Clothes are thus contributing to what one may call, an ‘extended’ body-image and body-schema.

In his seminal formulation, Gallagher defined ‘body image’ as “a complex set of intentional states and dispositions, perceptions, beliefs, and attitudes, in which the intentional object is one’s own body” (Gallagher 2005: 25). By contrast, the ‘body schema’, which is distinct from the body image, is a “non-conscious performance of the body, - i.e. a performance that is not an intentional object present to my consciousness” (Gallagher 2005: 548).

Interestingly, he points out, the body-schema can include tools and artefacts as well:

“the carpenter’s hammer becomes an operative extension of the carpenter’s hand, or as Head (1920) noted, the body schema extends to the feather in the woman’s hat (see Gorman 1969, p. 15). The body schema is an active, operative performance of the body, rather than a copy, image, global model, or conception of the existing parts of the body. The schema is the body as it actively integrated its position and responses in the environment. (...) The body schema, understood this way, is not the perception of ‘my’ body; it is not the image, the representation, or even the marginal consciousness of the body. Rather is it precisely the style that organises the body as it functions in communion with its environment” (Gallagher 1986: 548-9).

Here we suggest that the clothes may be described as a ‘second skin’ and as such they are an essential component of the transparent experiential background defined in section 1. These extended body image and body-schema crucially contribute to the constitution of one’s (i) bodily self (e.g. they keep us warm) and (ii) social (narrative) self (e.g. they serve as a social

signalling). Textiles allow individuals to closely relate to and exchange with the external physical and social world. This ‘extended skin’ can be integrated both in our body schema and body image, like the tools.

However, there is at least one important distinction between ‘extended body schema’ in tool as opposed to clothes (daily) experiences¹². Take for example a blindman’s stick. A successful tool use in this case implies that the individual successfully *attends to* the tip of the stick in order to explore and perceive its environment: she/he can ‘see’ with the stick. The same goes for the carpenter’s hammer: he needs to attend to the hammer’s contact with the nail in order to hit it correctly. By contrast, clothes need to be comfortable such as we can afford to dis-attend and ‘forget’ about them. In other words, to process them via what one may call an extended transparent experiential background. (Unless these proximal tactile experiences become unpleasant or uncomfortable (rough materials, itchy, dry skin), in which case they become ‘opaque’ and emerge at the surface of our awareness.

The extended mind thesis famously defended by (Chalmers & Clark 1998) claims that the cognitive processes can be ‘offloaded’ or ‘extended’ to reach beyond the boundaries of individual, such as they include as proper parts aspects of the individual’s physical and sociocultural environment (see Kirchhoff & Kiverstein 2019 for a recent review). In a similar vein, we propose that some perceptual bodily processes can be extended through (i.e. transformed into) components that reach beyond the sensory organ’s states (e.g. the skin) into what one may call an ‘extended skin’. The notion of ‘offloading’ refers to the use of artefacts (here clothes) to manage and convey information about the self (e.g. regulating body temperature via warm clothes; wearing a red T-shirt to signal that we support Arsenal football club).

Indeed, our representation of our own body and our bodily sensations do not seem to end on our skin; instead, the proximal space around the body, known as peripersonal space (PPS) is included in our multisensory representation of the body (see Serino 2019 for a recent review). Early neurophysiological studies in primates identified a specific population of multi-sensory neurons that selectively responded to external stimuli, but only when the somatosensory, visual or auditory stimulation occurred close to and not far from the body (Rizzolatti et al., 1981). Subsequent neuropsychological (e.g., di Pellegrino et al., 1997; di Pellegrino and Làdavas, 2015; Làdavas, 2002), psychophysiological (e.g., Maravita et al., 2002, 2003) and neuroimaging (e.g., Blanke et al., 2015; Bremmer et al., 2002; Cléry et al., 2015) studies showed that the processing of tactile information is strongly affected by external stimuli presented close to the body, further cementing the notion that a similar system in humans exists.

This space representation is thought to be dynamic rather than static, so as to maximize the processing of relevant events for the self, expanding and shrinking depending on environment specificities. Moreover, sociological and anthropological studies have revealed that the role of peripersonal in the type and strength of social and cultural interactions (Hall, 1990; Hall et al., 1968; Sommer, 1969; Felipe & Sommer, 2017). More recently, social neuroscience brought these ideas together to show that interacting proximally with another person influences how we perceive not only our own body, but also the space around it, depending on our precise

¹² We are grateful to an anonymous reviewer for pressing clarification on this point.

relationship with that person and how much we trust them (Heed et al., 2010; Teneggi et al., 2013).

A detailed discussion of the fascinating topic of the role of peripersonal space in constituting self-representations and our sense of self lied beyond the topic of this paper¹³. Rather in what follows we narrow our focus on the key idea that tactile experiences mediated via the skin and the ‘second skin’ become pervasive, transparent and allows what Gallagher called above a ‘communion with its environment’. In what follows we briefly outline the literally ‘close relationship’ between clothes and bodily and self experiences.

Throughout human history, individuals ingeniously made use of various materials close to their bodies – for protection, comfort, aesthetic aspects. Particularly textiles and clothes, which throughout the “long and intimate” (O’Connor, 2010) connection with people, were key in symbolic representations of self (e.g. identity, gender, age, class, political views, as well as variety of social values (Mida & Kim, 2015; Guy et al. 2001; Weber & Mitchell, 2004), in the reproduction of social order (e.g., in making social differences visible, see Entwistle, 2000; Breward, 2003; Crane, 2012), in embodying culture (memory, history, and identity), “and in transforming, protecting, and healing the human body” (O’Connor, 2010; see also Brumfield 2006; Hansen 2004). Many times, textiles have been used with varying degrees of explicitness as a medium to record history or to “provide a focus for the expression of conflict or reflect commentary on current affairs” (Henderson, 1990). The latter can be noticed for example in more codified manners, such as in Ganseys¹⁴, or in very explicit manner in t-shirts portraying rock music bands or political messages, a style very much influenced by Vivienne Westwood collaboration with Sex Pistols in the 1970s. Hence, we can view clothing as “The furniture of the mind made visible” (Laver in Barnard, 2007:2).

This long and intimate relationship also endowed textiles with magical, and at times humanlike characteristics in people’s imaginaries. Textiles may be perceived as being ‘alive’ (e.g. designers describe textiles as an animated, living thing with whom they engage in conversation to define what a textile wants to be as a garment (for a full account see Petreca et al., 2015)), or, as observed by Henderson (1990, p.1588) may be seen to “have supernatural properties” (e.g. the invisibility cape in Harry Potter novels), or “may be used as a metaphor for life” (e.g. “Penelope rips out her weaving nightly in order to arrest the flow of time”), or even to be “imbued with the characteristics of their wearers or impart special qualities to them” (e.g. the widespread culture of celebrities’ clothes auctioning, where pieces are sold at exorbitant prices¹⁵).

The clothes lie at the interface of the body and its social presentation, and they “signify to the wider world who and what a person is trying to express” (Salgado-Montejo et al., 2018). This symbolic level is rooted on the physical touch basis of the experience of wearing, and we saw earlier that this long and intimate, proximal experience, grants textiles ‘magical’ perceptions of ‘being alive’ and ‘being imbued with the characteristics of their wearers’. Indeed, clothes

¹³ See de Vignemont and Iannetti 2015 for an interesting discussion on different forms of peripersonal space.

¹⁴ A gansey (or guernsey) is a type of knitted woollen jumper, historically known for being worn by fishermen around the coast of Britain. Their unique patterns represented a village and a family, so that in the case of a shipwreck or accident, the bodies could be identified and returned to their family for care or burial.

¹⁵ This culture has reached the level of granting clothes and accessories even with world records, such as the most expensive ever pair of trainers, which was worn and signed by Michael Jordan, and sold at \$560,000 at a Sotheby's auction held on May 17, 2020. For a variety of examples see a recent feature, available at: <https://www.businessinsider.com/most-expensive-celebrity-memorabilia-items-sold-at-auction?r=US&IR=T#a-pair-of-nike-air-jordan-1s-game-worn-by-michael-jordan-in-1985-and-signed-by-the-player-sold-for-560000-in-a-sothebys-auction-1>.

1 have a unique capacity to provide immediate feedback to an individual, the wearer, affirming
2 their sense of identity at a directly embodied level (Twigg & Buse, 2013). Clothes can express
3 largely unconscious aspects of both an individual and of a group psyche (Salgado-Montejo et
4 al., 2018), and form a part of our non-verbal communication, or what is defined by Alison
5 Lurie (2000), a “universal tongue”.
6

7 What we wear reflects our personality, or undressed self, and therefore, it is a material
8 manifestation of our beliefs and behaviours, or “how we think and how we live” (Salgado-
9 Montejo et al., 2018: 2): “enclothed cognition is a bidirectional phenomenon, with the wearer
10 selecting clothes that reflect his/her personality and clothing having an influence on cognitive
11 processing and behaviour.” (Salgado-Montejo et al., 2018: 2). For example, it has been
12 suggested that people are efficient and effective in forming impressions of someone’s
13 personality via clothing, specifically shoes (Gillath et al. 2012)). Also, clothing can influence
14 self-perception. People wearing formal clothing considered themselves as competent and
15 rational (Hannover & Kühnen, 2002; Peluchette & Karl, 2007), and also have enhanced
16 abstract cognitive processing (i.e., comprehensive mental representations) and increased
17 perceived social difference and power (Slepian et al., 2015).
18
19

20 Up to now, we focused on proximal perceptual experiences as mediated by touch. We took
21 the example of clothes close to our skin as being a key element in extending our body schema
22 and body image into a transparent experiential background. In the last section of our paper,
23 we examine some of the implications of shifting the focus from visuo-spatial to proximal
24 perceptual experiences in relation to our sense of self and sense of presence in the world.
25 Specifically, we briefly describe the case of Depersonalisation, a condition that makes people
26 estranged and detached from their self, body and world. We discuss some empirically testable
27 hypotheses, to be developed in future work, highlighting the key role of proximal tactile
28 interactions with the environment on one’s sense of self and sense of presence in the world. If
29 correct, our hypotheses may fruitfully contribute to designing body-based and dynamic
30 interventions helping to alleviate feelings of self-estrangement and social alienation in people
31 suffering from depersonalisation symptoms.
32

33 § 4 The Transparent Bridge – Bodily Connectedness through the 34 (‘Second’) Skin 35 36

37 In Section 1 we saw that one key idea behind embodied cognition and Predictive Processing
38 accounts is that perceptual experiences are closely depended on and linked to dynamic
39 engagements and reciprocal interactions with others and the environment (Gibson 1979;
40 Schilbach et al. 2013). If this approach is correct, then our sense of self and presence or
41 immersiveness in the world may crucially depend on how we relate with our social and physical
42 surroundings. To put it in a slogan: the more we interact with the world and others, the more
43 we gain information about ourselves. Contrary to the standard approach that views the skin (and
44 tactile experiences) as a mere border separating the self and world, here we propose that the
45 skin (and its extended version, ‘the second skin’, i.e. the clothes) simultaneously and inherently
46 distinguish *and* connect the bodily self to its environment.
47
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While traditionally theorists have been concerned mainly with the subject-object polarity in describing perceptual experiences, throughout this paper we aimed at drawing attention at what is happening *in between* these two poles. For this reason, we proposed to shift our focus from visuo-distal perception (easier to structure around a subject/object axis) to proximal perception (and particularly on touch), where the key role of mediating boundaries become more evident. We motivate this shift in the light of the new and highly influential Predictive Processing theories of perception. If indeed whatever we perceive now is infused by whatever is perceived priorly, then it becomes crucial to endorse a dynamic and situated viewpoint in examining perception. As it happens, humans start to perceive themselves and their close environment, already in the womb, via proximal senses (such as touch) way before vision. Furthermore, human babies are unable to self-regulate their own homeostatic balance, hence they fundamentally depend on close physical interactions dedicated caregivers for survival (Ciaunica & Fotopoulou 2017; Ciaunica et al. 2021). As toddlers and adults, we actively explore our proximal surroundings and touch objects to make sure they are real. Since all humans have started their experiential journey as babies within an other's body, the relational aspect of perceptual experiences needs to be examined with greater care and attention.

While there is growing awareness that perceptual experiences are multisensory in nature, in this paper we narrowed our focus on the inescapably dual *touchant/touché* structure of the tactile experiences. This reciprocity and duality place touch in a key position highlighting the inherent relatedness of our bodies with its close the physical and social world. We propose to label this overlooked relational background mediated by the proximal senses – and particularly by touch – as a '*transparent experiential bridge*' which is there without us being aware that is there. In the remainder of this section we would like to suggest that in daily life, healthy humans constantly use this transparent bridge to communicate and to relate with the world and others, without paying too much attention to its 'invisible' and 'transparent' underlying structure and pillars, so to speak. However, the importance of this key relatedness becomes apparent especially when this 'transparency' breaks down, and people start feeling unreal and disconnected from their selves, bodies and the world.

As Ratcliffe rightly points out, people usually talk about a self as distinct from the body whenever they feel something is disrupted or amiss with the self: something that has gone wrong or something that is lacking. To use our initial metaphor: we notice more easily the existence of a transparent window when its glass cracks (Ciaunica et al. 2020). When the mediating function of transparent senses gets disrupted, people feel trapped inside their minds and outside their body, self and world.

Initially described by Dugas in 1898 (Berrios and Sierra 1997), Depersonalisation /Derealisation Disorder (DP/DR) is a condition characterised by profound alterations of one's sense of self (Sierra & David 2011), typically inducing distressing feelings of detachment or estrangement from one's self (depersonalization) and/or one's surroundings (derealisation) (DSM IV-TR fourth edition, text revision 2000)¹⁷. DP/DR typically co-occurs in association with highly traumatic events or as symptoms of anxiety, panic, and depression.

¹⁷ The other major classificatory system used in contemporary psychiatry is the ICD-10 (International Classification of Diseases, World Health Organisation). While there are some important differences between DSM and ICD, both they largely agree upon the diagnostic criteria for DPD, which are the following: a) persistent symptoms of DP/DR not occurring as part of another disorder or be directly substance-induced; b) the individual should not be suffering from psychosis (which would imply a different diagnosis, such as schizophrenia). DSM adds the criterion c) there should be significant distress and/or functional

1 These dramatic alterations are typically experienced as a ‘split’ or a ‘fracture’ between an
2 external observing agent and an observed self, body and world: “*My perception felt as though*
3 *it had been drawn back inside my head, almost as though I was looking at the world from the*
4 *back of my head, and could see the back of my own eye sockets. (...) Essentially, it felt like there*
5 *was a divorce or fracture between the world and me so that although my body was still in the*
6 *world, my mind was only an observer*” (Ciaunica et al. 2020: 6).

7
8 The experienced self-split or self-detachment occurs on multiple levels, as it is associated with
9 (a) detachment from one’s body or body parts (low-level sensory and bodily aspects of the self);
10 (b) detachment from one’s subjective feelings and emotions (experiential aspects); and (c)
11 disconnection from one’s personal stories, memories, thoughts and future plans, often described
12 by sufferers as a lack of a narrative¹⁸ or a ‘plot’ in one’s life (Ciaunica & Charlton 2018). The
13 overall impact of this ‘self-split’ makes people feel “not fully real” (Medford 2012; Simeon and
14 Abugel 2006; Sierra 2009).

15 The prevalence of DPD is around 1-2% in the general population (Hunter et al. 2004), with
16 onset typically occurring before age 25. Strikingly, feelings of depersonalization are the third
17 most common psychological symptom reported in the general population (after anxiety and low
18 mood), especially among young people (Simeon et al. 2003). Yet the underlying neural and
19 computational mechanisms as well as its phenomenological markers remain poorly understood
20 (see Seth et al., 2011 for an early attempt).

21
22 The experience of a ‘split’ between the self and the body—strikingly described as feeling
23 trapped in one’s head (mind) and outside one’s body (Ciaunica et al. 2020)—is one of the most
24 frequently cited symptoms in DPD (Sierra & David, 2011). Sierra (2009) lists four prominent
25 types of anomalous body experiences in DPD: (1) lack of body ownership (2) feelings of loss
26 of agency (3) disembodiment feelings and (4) somatosensory distortions. Empirical support for
27 this disrupted bodily sensory processing comes from studies that demonstrate disrupted
28 physiological responses in patients with DPD, compared to healthy participants (Dewe et al.,
29 2018; Owens et al., 2015; Sierra et al., 2002). DPD has also been linked to disrupted activity in
30 neuronal regions underlying somatic processing (Lemche, Brammer, et al., 2013; Medford et
31 al., 2016) and the vestibular system (Jáuregui Renaud, 2015), which is responsible for providing
32 information about the body’s position in space (Ferrè & Haggard, 2016).

33
34 A detailed discussion on this condition would lead to a substantial digression (see Sierra 2009;
35 Sierra & David 2011; Medford 2012; Simeon and Abugel 2006; Billon 2016; Ciaunica et al.
36 2020). Here we propose to narrow our focus on relational aspects between the self and the
37 world, dramatically reported by a patient as follows:

38
39 “*When the depersonalisation is very deep, I still seek to 'be' someone else because it*
40 *feels like that constant source of interaction is the only thing that allows me to maintain*
41 *a connection with the world. I'll also seek physical contact with whoever I'm with. It*
42 *almost feels as though I need to be that other person because my own sense of self is not*
43 *strong enough in that moment to sustain me.*” (Ciaunica & Charlton 2018)

impairment. This seems appropriate, as otherwise it is hard to argue that the phenomena can usefully be seen as pathological (Medford et al. 2005).

¹⁸ “Now I experience depersonalisation more of a lack of narrative; moments seem to melt away as soon as they have passed and life appears to pass as a series of unrelated frames. (...) You may be able to function, but creating a credible narrative for your life would be challenging” (Ciaunica & Charlton 2018).

1 This observation may be crucial for potential interventions and therapies designed to make DPD
2 people aware of what *still connects* them with their self, body and the world, despite the fact
3 that they feel dramatically alienated. Specifically, future work needs to disentangle and contrast
4 the role of proximal versus distal senses in shaping the experience of being a self present in the
5 world and fully connected with one's body.

6
7 If our argumentation throughout our paper is correct, then future research needs to assess
8 whether active engagements with the world and others via proximal (tactile and multisensory)
9 interactions enhance the sense of self, realness and presence in people with DPD. By contrast,
10 we speculate that distant visuospatial experiences – such as seeing/recognizing oneself in the
11 mirror – will enhance feelings of estrangement and self-detachment, of being inside one's head.
12 Moreover, we hypothesise that close and dynamic physical and synchronous interactions with
13 their environment will make DPD people feel more present in their bodies, and less 'trapped'
14 in their minds. This is because, paradoxically, in order to get closer to one's self, one needs to
15 be able to 'forget' oneself (Ciaunica et al. 2021b, submitted) and to be able to open to the world
16 and others, via proximal tactile interactions.

17
18
19 The accent thus needs to be put on what connects us to ourselves and the reality, as opposed to
20 what separates us from it, especially when we feel isolated and alienated. To use our metaphor,
21 even if the transparent bridge that connects people with their self, body and world is shattered,
22 it is important to stress that it remains available and *can* be crossed. As Ratcliffe insightfully
23 notes : “talk of feeling detached from body and world might best express an all- pervasive
24 feeling of estrangement but, importantly, that feeling is *itself* a way of experiencing the body-
25 world relationship and so one has not actually escaped from body and world at all” (2008:131).

26
27
28 In line with this approach, we have recently piloted the sense of connection through touch in a
29 set of experiential interventions with the microphenomenologist Claire Petitmengin
30 (Petitmengin et al. 2018). We have explored the aspect of quality of movements in textile
31 experience further with designers through the Micro-phenomenology interview method¹⁹
32 (Petitmengin, 2006; Petitmengin et al., 2013; Petitmengin et al., 2018) to go deeper into pre-
33 verbal and non-verbal experiences (i.e. movement and touch behaviour). Briefly, participants
34 explored with their hands and with closed eyes unknown objects for an extended time. They
35 were then invited to share the experiences focusing on how they became aware of the interface
36 of touch. Participants typically used images that were porous ‘I felt fizziness’ often integrating
37 social and spatial domains; “I felt open towards you”. Some would spontaneously describe a
38 difference between touching and being touched. This distinction was subsequently frontloaded
39 (Gallagher 2003) into an exploration of another object. Participants were again invited to share
40 these experiences, particularly noticing the distinction between touching and being touched,
41 and on how sense of self and agency was experienced²⁰. Such simple intervention appears to
42 have the potentials to make visible those processes which connects us to our surroundings in

¹⁹ This method combines psychology and phenomenology approaches to obtain a first-person, fine-grained verbal description of subjective experience that is generally inaccessible or difficult to articulate (Varela and Shear, 1999), and it reduces post-rationalization (Hogan et al., 2015). By using specific guidance (through questions and non-verbal cues) it helps people to become aware of nuances in the experience being described (Petitmengin et al., 2013). Hence, the method is presented as a “psychological microscope” (Bitbol and Petitmengin, 2013).

²⁰ A video detailing an excerpt of the experiment can be found here <https://www.eer.info/activities/being-aware-sharpening-our-tools>.

ways that are both proximal and intimate. Future research will explore this in the context of depersonalisation and other disturbances in embodied self perception.

Conclusion

In this paper we built upon the influential Predictive Processing premise that the perception of incoming ‘whatever next’ sensory information emerges from the processing of ‘whatever before’, i.e. priors or ‘expectations’ (Clark 2013). We argued that the term ‘next’ here must include not only the temporal aspect (i.e. the processing of upcoming inputs), but also the spatial dimension (i.e. the processing of upcoming inputs next-to-my-body). This is because accurate information processing of proximal sensory signals is key to organism’s survival in the here and now. While traditionally perceptual experiences have been described mostly in terms of distal visual perception (e.g. I perceive an apple), there is mounting evidence pointing to the importance of proximal and multisensory aspects of perceptual awareness.

We narrowed our focus on tactile proximal interactions that are close to our bodies. We explored the special relationship between touch and body, and argued in line with the phenomenological accounts, that tactile experiences form a pervasive yet transparent experiential background, typically unnoticed and taken for granted. The key claim was that the body-world relationship remains tacitly and ubiquitously in the background and the sense of self is inseparable from this relationship.

To support this claim, we reviewed developmental empirical work from pointing to the idea that (discriminative and affective) tactile inputs play a fundamental role in constituting perceptual experiences in utero and in early life. We then explored the idea that our transparent experiential background includes also garments (i.e. objects and materials close-to-our-skin) that can be viewed as a ‘second skin’ or ‘extended skin’. As such they constitute what one may call, following Clark & Chalmers (1998) and Gallagher (2005) seminal formulations, an ‘extended’ body-image and body-schema.

While traditionally perceptual experiences have been described as having a subject-object polarity, throughout this paper we aimed at drawing attention at its relational aspect, i.e. what is happening *in between* these two poles, especially when the sensory signals are proximal as opposed to distal. Shifting focus from visuo-distal perception (easier to structure around a subject/object axis) to proximal perception (and particularly on touch), allowed us to outline the key relational role of tactile interactions with the physical and social environment. We motivated this shift in the light of the new and highly influential Predictive Processing theories of perception. If indeed whatever we perceive now is infused by whatever is perceived priorly, then it becomes crucial to endorse a dynamic and situated viewpoint in examining perception.

Our speculative proposal stipulates that proximal and tactile perceptual engagements with the physical and social world may form a pervasive yet transparent experiential bridge, typically unnoticed and taken for granted. Keeping this ‘bridge’ open is essential in constituting the feeling of being real, present and immersed in the world, especially when one’s sense of self is shattered, as in the case of Depersonalisation Disorder. If this is so, then future work and interventions need to focus on initiating and restoring dynamic and proximal engagements with our social and physical world in order to rebuild the ‘invisible’ transparent yet essential basis of our sense of self and sense of presence in the world.

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