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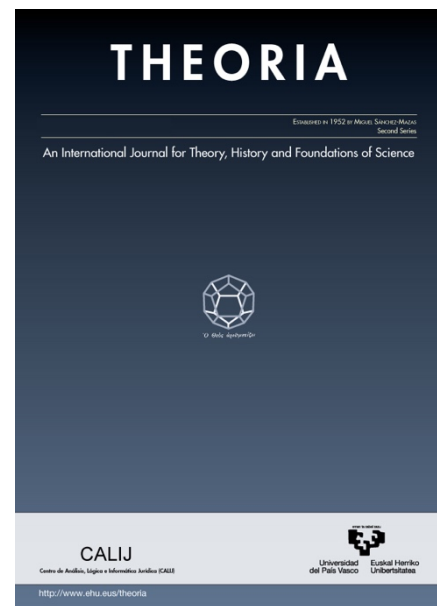
Why a perceptual zero-point amounts to nothing

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WHY A PERCEPTUAL ZERO-POINT AMOUNTS TO NOTHING

(Por qué un punto cero perceptivo no significa nada)

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ABSTRACT: The concept of a “zero-point,” the bodily origin of the first-person perspective or the egocentric spatial frame of reference through which we encounter the world, is pervasive in phenomenological accounts of perception. I will argue that the zero-point is a complete abstraction that misleads the analysis of perception and action. In contrast, body-schematic processes involved in perception and action are multi-dimensional, complex and complicated by temporal and intermodal factors. I consider several different characterizations of the zero-point: as an objective physiological point, as a geometrical point, or, phenomenologically, as part of one’s experience. I examine evidence from vision studies, and more generally from studies of sensory-motor processes, action, and intersubjective interaction. I reference the work of José Bermúdez in this area and briefly outline an alternative notion that better captures what the zero-point was meant to capture. Bermúdez’s analysis helps us to see that there is no point to the concept of zero-point.

Keywords: zero-point, perception, action, egocentric spatial frame of reference

RESUMEN: El concepto de un “punto cero”, el origen corporal de la perspectiva de primera persona, o del marco de referencia espacial egocéntrico desde el que nos relacionamos con el mundo, es recurrente en los enfoques fenomenológicas de la percepción. En este trabajo, argumentaré que el punto cero es una completa abstracción que distorsiona el análisis de la percepción y la acción. Por el contrario, los procesos esquemáticos corporales involucrados en la percepción y la acción son multidimensionales, complejos y están influidos por factores temporales e intermodales. Consideraré diferentes caracterizaciones del punto cero: como un punto fisiológico objetivo, como un punto geométrico, o, fenomenológicamente, como parte de la experiencia subjetiva. Examinaré evidencia proveniente de los estudios de la visión y, de forma más general, de estudio de los procesos sensoriomotores, la acción y las interacciones intersubjetivas. Haré referencia al trabajo de José Bermúdez en este campo y esbozaré brevemente una noción alternativa que capta de mejor manera lo que el concepto de punto cero pretendía capturar. El análisis de Bermúdez nos ayuda a ver que no hay razón para mantener el concepto de punto cero.

Palabras clave: punto cero, percepción, acción, marco de referencia espacial egocéntrico

SHORT SUMMARY: The concept of a “zero-point,” the bodily origin of the first-person perspective or the egocentric spatial frame of reference through which we encounter the world, is pervasive in phenomenological accounts of perception. I will argue that that the zero-point is a complete abstraction that misleads the analysis of perception and action.

The concept of a “zero-point” (*Nullpunkt*) is pervasive in phenomenological accounts of perception (e.g., Husserl, 1989; Merleau-Ponty, 1964; Morley, 2001; Parnas et al, 2005; Stein, 2012). The zero-point is meant to signify the bodily origin of the first-person perspective or the egocentric spatial frame of reference through which we encounter the world. Although it is meant to be a very embodied concept, since the zero-point is said to be located in or at the body, I’ll suggest that it is a complete abstraction that misleads the analysis of perception and action. Specifically, I’ll argue that body-schematic processes involved in perception and action are “thick,” multi-dimensional, or complex with varying perspectives running along axes relative to different parts of the body, and complicated by temporal and intermodal factors. Perception is better characterized as involving multiple trajectories rather than a zero-point.

I’ll start by indicating how the zero-point has been characterized in phenomenology, as well as in analytic philosophy of mind. I’ll consider several different characterizations: as an objective physiological point, as a geometrical point, or, phenomenologically, as part of one’s experience. I’ll introduce evidence from studies of vision, examine the concept of ‘zero-point aspects’ as outlined by Horgan and Nichols (2016) and then look more generally at sensory-motor processes, action, and intersubjective interaction. I’ll show that in all these cases a zero-point is not to be found. Finally, with reference to José Bermúdez’s work in this area, I’ll briefly outline an alternative notion that better captures what the zero-point was meant to capture. Bermúdez’s analysis helps us to see that there is no point to the concept of zero-point.

1. Phenomenological accounts of the zero-point

William James, in his *Essays in Radical Empiricism*, suggests that our experience of the world is accompanied “at all times with our body as its center, center of vision, center of action, center of interest. Where the body is is ‘here’; when the body acts is ‘now’; what the body touches is ‘this’; all other things are ‘theres’ and ‘thens’ and ‘thats’” (1976, p. 86n). This implies that the worldly things in one’s environment fit into a pervasive organization that refers back to an origin of perception, action, and interest located in subject’s body, and that this orders all of one’s experiences, including thoughts and feelings, which “terminate in the activity of the body.... The body is the storm center, the origin of coordinates, the constant place of stress in all that experience-train” (1976, p. 86n).

Around the same time as James's essays, Husserl tries to capture the same idea in the concept of the zero-point in his discussions of the lived body, and in a variety of contexts. For example, in his posthumously published *Ideas, Vol II* he writes:

[A]ll spatial being necessarily appears in such a way that it appears either nearer or farther, above or below, right or left ... The lived body then has ... the unique distinction of bearing in itself the zero point (*Nullpunkt*) of all these orientations. (Husserl, 1989, §41a; also see Husserl, 2006, §5)

Or again,

The lived body is, in the first place, the medium of all perception. ... [O]bviously connected with this is the distinction the body acquires as the bearer of the zero point of orientation, the bearer of the here and the now, out of which the pure Ego intuits space and the whole world of the senses. (Husserl, 1989, §18)

Accordingly, Husserl describes the zero-point as belonging to the lived body, and as involved in spatial perception, and specifically as providing the origin point of spatial orientation. He elaborates further about both our sense of orientation and direction in spatial experience, the zero-point's relation to the body, and its connection to a persistent lawfulness in behavior.

[One's momentary focus] is necessarily related to the zero-point of orientation, to the absolute 'here', and to the concomitant system of the depth dimension (forward-back), and of the breadth and height dimensions (right-left, above-below). (1989, §32)

The body then has ... the unique distinction of bearing in itself the zero point of all these orientations. One of its spatial points, even if not an actually seen one, is always characterized in the mode of the ultimate central here: that is, a here which has no other here outside of itself, in relation to which it would be a 'there'. It is thus that all things of the surrounding world possess an orientation to the body, just as, accordingly, all expressions of orientation imply this relation. (1989, §41)

It's clear that Husserl takes the zero-point to be an intrinsic feature of one's bodily and spatial experience, such that it has a phenomenological sense.¹

The notion of the zero-point is not a minor issue, since it seemingly characterizes the first-person perspective and is relevant not just to spatial experience, but to notions of the self (or ego), is referenced in analyses of psychiatric disorders (e.g., Henriksen et al, 2019; Parnas et al, 2005), and is also involved in characterizations of intersubjective empathy. As Edith Stein (2012, p. 63), for

¹ Note that Husserl uses the term 'zero-point' differently in a number of other contexts pertaining to affectivity and temporality (see, e.g., Husserl, 2012).

example, put it, “I experience the other as having another ‘zero point of orientation’ (*Null-Punkt der Orientierung*).” One also finds the notion in Sartre: “[T]he perceptive field refers to a center objectively defined by that reference and located in the very field which is oriented around it. Only we do not see this center as the structure of the perceptive field considered; we are the center” (1956, p. 365). More generally it can be found as part of the phenomenological analyses that involve the character of memory or imagination insofar as these cognitive acts involve a kind of representation (*Vergegenwärtigung*) of what has been or could be presented in perception (see, e.g., Morley, 2001).

A similar phenomenological account can be found in analytic philosophy of mind. I’ll briefly point to two examples, the first one a very clear example that references Husserl’s concept directly; the second, a more ambiguous example centered around Gareth Evan’s work, and some issues that relate in some regard to developments in phenomenology, especially in the work of Merleau-Ponty (more of which later).

Consider first an important article by Terry Horgan and Shaun Nichols (2016), entitled “The zero point and I.” I’ll discuss this article in more detail later, but here let me just note that Horgan and Nichols point in two directions: back to Husserl, who they explicitly cite as the origin of this idea, and forward to a set of conceptual issues to which they think this idea has relevance. As they put it, “An enormously fruitful idea we will draw upon from the continental tradition is the one expressed by Husserl’s expression ‘*der Nullpunkt?* (the zero point)” (2016, p. 148). As they indicate, this is a fruitful idea precisely because it has relevance to a number of problems, including: the intrinsic aspects of phenomenality, phenomenal intentionality and non-reflective self-awareness; sensory-perceptual experience; voluntary-action experience – including self-agency/self as origin; the temporal structure of experience; and a variety of cognitive processes that involve desire, intention formation, and belief formation. I’ll return to the issue of whether they remain faithful to Husserl’s specific interpretation of the zero-point.

Another ongoing discussion of the zero-point in analytic philosophy of mind can be seen in Christopher Peacocke’s (1992) notion of ‘scenario content’ which involves a point of origin, which he locates in the middle of the chest. Peacocke draws this idea from Gareth Evans’s concept of the egocentric spatial frame of reference. There is, however, some debate in the literature about whether the egocentric spatial frame of reference actually involves a zero-point. On the one hand, Quassim Cassam (1997) explicitly links Evans’ analysis of the egocentric spatial frame of reference to Husserl’s zero-point and writes that “the Body ... is the zero point or point of origin of egocentric spatial perception” (1997, p. 53). Likewise, Lilian Alweiss (2018) recently made the same link defending Husserl’s notion of the lived body as the zero-point in contrast to what she takes to be Evans and Cassam’s reference to a material, objective body. On the other hand, Rick Grush (2005; see Briscoe & Grush, 2017) argues that Evans pre-figured sensory-motor contingency theories of the sort that one finds in Alva Noë (2004; also see Gallagher, 2024 for discussion of this point). As Evans puts it (1982, p. 160): “There is only one egocentric space, because there is

only one behavioural space,” emphasizing the correlation between perception and action and the experience of space. Thus, Evans states:

[... H]aving the perceptual information at least partly consists in being disposed to do various things ... The subject hears the sound as coming from such and such a position, but how is this position to be specified? We envisage specifications like this: he hears the sound up, or down, to the right or to the left, in front or behind, or over there. It is clear that these terms are egocentric terms: they involve the specification of the position of the sound in relation to the observer's own body. But these egocentric terms derive their meaning from their (complicated) connections with the actions of the subject ... (Evans, 1985, pp. 383-384)

I will not try to resolve the issue about how to interpret Evans, although I'll suggest that with Grush's interpretation we can start to see some complications that challenge the very notion of a zero-point. Some of these complications involve the fact that our mobile eyes are set within a head that can turn, and which is attached to a body that can turn, bend, assume different postures, and move from place to place. The concept of a zero-point tends to be modeled on a stationary point of view, the 'here' and 'now' which is only the limiting case of a mobile point of view. What we see, hear, touch, taste and smell is conditioned by what we do, and what we are capable of doing—our pragmatic possibilities based on the sensorimotor capacities of our bodies. “In ordinary experience, perception and movement are always united. I touch something by moving the arm. I see something by moving the head and eyes. What is perceived is perceived as nearby and perhaps reachable, or further way, as something that can be approached and explored” (Gallagher & Zahavi, 2020). Our perceptual organs (eyes, hands, ears, etc.) function in a way that is intertwined with our body's kinesthetic experience (Husserl, 2013). I'll argue that these are factors that complicate claims about a zero-point.

2. *Three conceptions of the zero-point*

It's well known that in western philosophical traditions vision is the dominant metaphor for cognition. That aside, the actual experience of vision suggests that there is something like an origination point; but what precisely is this point, and what do we mean by it? There seem to be three options.

- The zero-point is a real *physical* (physiological) point where visual information is processed
- The zero-point is a *geometrical* (ideal) point, the intersection of a set of lines that we might draw from objects back to our perceiving body

- The zero-point is a *phenomenological* point that we experience prereflectively as part of our visual experience

It will be useful to explore all of these options (also see section “Zero-points and self-location”). First, concerning a *physical zero-point*, consider a description of egocentric spatial organization given by Merker (2013, pp. 9-10). Attention is said to originate from a single point located inside our body, namely “at the proximal-most end of any line of sight or equivalent line of attentional focus.” What we find in the objective physiology of normal binocular vision, however, is a real mix of processes happening across a complex set of anatomical structures. We might look for a physical zero-point in a number of these places. Might we find it at the optic nerve where retina is connected to the rest of the visual system? But, assuming we have two eyes, we operate two optic nerves, and a visual center cannot be in two places. The optic chiasm, then, where signals tend to meet? But the optic chiasm is a structure (not a zero-point) where a division or diversification rather than integration occurs (signals from respectively left and right sides of the retinas crossing contralaterally rather than meeting up). Is there a zero-point in the cortex? It’s well known that what we find in the visual cortex is distributed processing in different areas (V1, V2, V3 ...) and no one place (a Cartesian theater) where it all comes together. Moreover, if there were some place of visual binding, the binding itself would be of a complex visual scene and we would still have to specify some kind of zero-point related to that scene.

One possible candidate for a physiological zero-point related to vision – a mid-brain structure called the superior colliculus [SC] (in mammalian brains; the optic tectum in other vertebrates). Neurons in the surface layers of the SC receive direct input from retinas and almost exclusively respond to visual stimuli. SC is involved in behavioral responses toward specific points in egocentric space – the result of visual stimulation or attention. It contains one or more topographical maps correlated with retinotopic coordinates that are activated in ways that allow the organism to respond (e.g., with eye movements or head turns, or shifts of attention) to points in egocentric space (Katyal et al, 2010).² The SC may be activated by visual input or by cortical activation.

Note, however, that the SC is bicameral – some neuroscientists refer to it in the plural; thus, “In each SC, the map represents the contralateral visual field” (Katyal et al, 2010, 3075). This duality clearly challenges the idea that there is a zero-point located somewhere on the SC (or *colliculi*) maps. The fact that there is more than one map, and that the maps are organized in different layers complicates things. In the end, then, if we are looking for a clear physiological locus for the zero-point, it’s not clear where we can find it. This lack of a physical candidate also highlights the fact that if there is an experiential zero-point (visually or otherwise) it is not necessarily the case that its neurophysiological correlate (if there is such a thing) will be isomorphically a zero-point.

² I thank Sucharit Katyal for calling this to my attention at a conference on the First-Person Science of Consciousness – Theories, Methods, Applications. Witten, Germany (23-25 May 2019).

When we start to think of different types of experiences – not just perception and its spatial framework – the notion of a localizable zero-point gets more obscure. As Marchetti (2024, p. 8) points out, citing Revonsuo (2006), “Our emotions are located somewhere in our body; we feel our memories as originating and located in ourselves; we have ideas and thoughts in our mind, etc.” But it’s difficult to point to any origination points for any of these experiences. More generally, the zero-point remains “elusive” (Williford et al, 2012; 2018; Marchetti, 2024). If the zero-point were a physical thing, like an eye, even then it “is excluded from the contents of consciousness by the same geometric necessity that prevents an eye from viewing itself, though it is the instrument for viewing all else” (Merker, 2013, p. 10).

The idea of a *geometrical zero-point* has been proposed by Blanke and Metzinger (2009) to characterize the origin of the seeing subject’s embodied perspective. They call this a weak first-person perspective which could be understood as “a purely geometrical feature” of our visuospatial presentation of reality. This would be an ideal (unreal) geometrical point, located on some virtual or ideal axis. Horgan and Nichols (2016) refer to it as “Husserl’s mathematical metaphor” and they link it to Cartesian coordinates, i.e., where the x and y axes meet. But this does not seem to be what Husserl means by zero-point since his claim is that the “lived body has the unique distinction of bearing in itself the zero point (*Nullpunkt*) of all these orientations” (1989, §41a). Accordingly, Husserl’s claim is not purely formal or geometrical; it’s about something that we literally experience – and *experiential zero-point*. Merleau-Ponty makes this clear: for phenomenology,

Space is no longer what it was in [Descartes’] Dioptric, a network of relations between objects such as would be seen by a witness to my vision or by a geometer looking over it and reconstructing it from outside. It is, rather, a space reckoned starting from me as the zero point or degree zero of spatiality. I do not see it according to its exterior envelope; I live in it from the inside; I am immersed in it. After all, the world is all around me, not in front of me. (Merleau-Ponty, 1964, p. 178)

The idea that the zero-point is part of our experience is also defended by Barry Dainton who proposes that “in any perceiving, experiential contents of whatever type can only seem to be presented to a subject if the subject itself has the impression of being itself spatially related to what it is perceiving. Ordinary human phenomenal fields are thus centred rather than centreless” (Dainton, 2016, p. 130). More than perception is included in human phenomenal fields, however. There are obviously other experiences that are also characterized by first-personal phenomenality. Consider feelings of joy, despair, or shame. Does it seem that their phenomenality is more centered than distributed?

What could count as an embodied experiential zero-point? There are several candidates that we can consider. For example, could the zero-point correspond with the blind spot? It seems not, since that point is both outside the body and outside of our phenomenology, that is, we don’t experience it in normal vision. Could it be at the experienced focal point of our attention? This

would seem to be on the wrong side of the intentional relation. That is, Husserl describes the zero-point as something pertaining to the subjective noetic aspect of consciousness (the focusing) rather than to the noematic side, that is, the intentional (focused-upon) object in the perceptual field. Moreover, with respect to the perceptual field, the phenomenology of vision is more complex than what's in focus or in focusing. It is never just perception of a focal point, but always includes a periphery, a horizon – a visual landscape arrayed in front of us.³ The important question is whether that visual landscape refers us back to something of the lived body that we experience prereflectively as we experience the world? Even if a positive answer recommends itself, is that experience ever an experience of a zero-point? Philosophers like Dorothee Legrand (2011) and Helena De Preester (2007) contend that this prereflective and non-transitive awareness of one's own body is not of a bare orientation point but of an experienced volume, a kind of substantial thickness of one's "deep" body. In this regard, the experiencing subject is more than a perspectival zero-point; phenomenologically, it is something > 0 .

Also, vision is never just bare vision; vision always involves cross-modal connections with other senses. Husserl (2013) indicates that it involves kinaesthesia. For example, ocular muscles operate such that they allow us to focus, providing an implicit sense of movement that is part of visual experience. Perception more generally is intermodal – vision, for example, registers in other sense modalities, in the same way that taste is not strictly on the tongue. Hearing is in stereo since we typically listen with two ears, and it's the position and distance between our ears that define our sense of where the source of the sound is. Likewise, if we are moving or if the object is moving, we might think that a trajectory rather than a zero point is involved.

The idea of a trajectory is related to the fact that there is an underlayment to perception that includes bodily dimensions and motoric processes. Vision is embedded in an articulated hierarchy of moving parts and degrees of freedom: the eyes move; the head turns; the torso turns; I can move up or down or laterally to change my perspective. Vision is thick with both the possibility and actuality of motoric kinaesthesia. This cross-modality is also reflected in the organization of the superior colliculus in which deeper neuronal layers involve multi-sensory integration.

3. *The sensorium moves, and a clue from Bermúdez*

I suggest that having *two* ears is like having two eyes and, accordingly, the auditory sensorium also operates with complex disparities. Taste is no simpler; there are (at least) *three* areas of the palate

³ Things are complicated in vision, not only physiologically, but as one gets closer to the conscious aspects of vision. Aspects of vision that we rarely notice but that we can be made aware of include binocular disparities (required for depth perception), motion parallax, and physiological diplopia. In the case of the latter, for example, an object outside the point of focus may be seen as double. This is typically edited out/suppressed by the brain so we are unaware of it, but some children notice it and complain of double vision. In fact, they have normal vision and they simply have to learn to ignore the diplopia.

and tongue (as wine connoisseurs know well), with taste also a distributed process that involves at least *one* nose. It's difficult to find any 0s in the accounts of any of these senses.

In touch there are multiple lines of orientation since touch potentially involves not only two haptically oriented hands but can also involve different parts of the body as well as proprioception and kinaesthesia. This becomes clear when we consider haptic movement.

Indeed, one might suspect that the zero-point as a standard of orientation is better conceived in motoric terms, or in terms of enactive sensory-motor contingencies. In this regard, Merleau-Ponty weighs in. Like Gareth Evans (at least on one interpretation), he is not in favor of the zero-point. Merleau-Ponty discusses, but never takes up Husserl's notion of the zero-point of orientation. In his Sorbonne lectures (2010), in a running commentary on Husserl, he summarizes Husserl's idea of the zero-point without endorsing it (2010, p. 75); he later uses it to describe von Uexküll's view of the *Umwelt*. Rather than the zero-point Merleau-Ponty discusses a more holistic body schema as the organizer of the perceptual field; the body enacts a "motor-perceiving" (2010, p. 216). There is, first,

the postural schema. All the elements of position totalized are either in series or simultaneously... and referred to the space of the world. Second, more generally there is an intersensorial system of equivalences that functions as a whole.... Third, there is an account taken of my movements.... The corporal schema furnishes me with the tracing that intervenes in the reading of the world (e.g., the active movements of the eye and the rest of the world despite the movement of images). (2010, p. 217)

If perception is enactive, even if it is visual perception, it involves not just eyes but bodily position, hands and the degrees of freedom that define whether I can reach the object or not. What allows for this is a thick and articulated schema, rather than a zero-point. In the *Visible and Invisible*, Merleau-Ponty talks about the body as "a dimensional this" – a "field" (1968, p. 260). He takes Husserl's well-known example of one hand touching the other hand and then reversing the touching and touched (what Merleau-Ponty calls 'reversibility') and he finds a shifting difference (*écart*) between them rather than a zero-point. The touching never hits zero – it is always on the verge, always "offset" – he calls it the "zero of being which is *not nothingness* (p. 260) – a zero that is always something more than zero.

Merleau-Ponty characterizes movement in a way that undercuts anything like a zero-point:

The movements of one's own body are naturally invested with a certain perceptual signification, they form a *[well-articulated] system with external phenomena* so tightly woven that external perception "takes account" of the movements of the perceptual organs, and it finds in them, if not the explicit explanation, then at least the motive for the intervening changes in the spectacle and can thereby understand these changes immediately (Merleau-Ponty, 2012, p. 49; emphasis added)

Charles Taylor draws on Merleau-Ponty and explains this perhaps more clearly:

Our perceptual field has an *orientational structure* . . . In those rare moments where we lose orientation, we don't know where we are; and we don't know where or what things are either; we lose the thread of the world, and our perceptual field is no longer our access to the world, but rather the confused debris into which our normal grasp on things crumbles. . . . (Taylor, 1995, p. 23; emphasis added)

This kind of confusion seems unlikely if we carry around a zero-point that anchors our perspective.

It is not just that the field's perspective centers on where I am bodily—this by itself doesn't show that I am essentially an agent. But take the up-down directionality of the field. What is it based on? Up and down are not simply related to my body; up is not just where my head is and down where my feet are. For I can be lying down, or bending over, or upside down . . . I have to maintain myself upright to act, or in some way align my posture with gravity. Without a sense of 'which way is up', I falter into confusion. (Taylor, 1995, p. 23)

I note that in contrast to up and down, left and right may be more firmly anchored to one's body, not just in regard to what Kant pointed out about hands being incongruent counterparts (Kant, 1992; Gallagher, 2006), but in terms of the right always being on one's right (to the right of one's body) and the left being on one's left, and this doesn't matter if we turn around, or are upside down. If we are more anchored by our body in these lateral directions, that fact can only establish a centered axis. We would need to have a similar arrangement with up and down (which we don't, as Taylor indicates) to establish something like the reticle or crosshair of a zero-point.

José Bermúdez (2005) also gives us reason to move away from the idea of a single zero-point, or single egocentric spatial frame of reference. He suggests three frames of reference.

1. **The object-relative spatial frame of reference.** For example, when reaching one's hand to grasp an object there is a trajectory from the initial position of the hand to the position of the relevant object. That trajectory links hand and object in the same "object relative" spatial framework, which is equivalent (following Evans) to what is standardly called the *ego- [or body-] centric spatial frame of reference*.

The important point is that in the object-relative spatial frame of reference the orientation is centered on the hand that is reaching. If the other hand was doing the reaching, there would be a different hand-centric frame of reference. Likewise in the case of kicking with my left versus right foot, etc.

In addition, however, Bermúdez identifies two more spatial frames of reference.

2. **The internal spatial framework:** in some kinds of actions, one has to calibrate between the object/body-centric framework and an internal organization (keeping track of one limb's relative to other limbs). His example is returning a volleyball – we need to keep track of the ball in egocentric space, but also we need to keep track of how our hands relate to one another.

3. **The orientation frame of reference.** This is equivalent to what Charles Taylor describes in reference to gravity and orientation (involving vision, kinaesthesia, and vestibular processes for position and balance).

These three spatial frameworks need to be integrated in our experienced action. Accordingly, we get a three-fold, more complex gestalt structure rather than anything as simple as a zero-point. A good example of this is something we do everyday: dressing. Putting on your clothes involves a complex set of movements that require coordination in all three spatial frames of reference.

Even if we focus on just the first, object-relative or egocentric frame of reference, there is a complication. When I reach to grab an object I usually do so as I visually focus on it, or at least make a quick glance to determine its location. So, simultaneously it seems I have a visual zero-point seeming centered in the neighborhood of my eyes, plus a zero-point centered at my hand. Imagine the act of punting in a game of American football where you are preparing to catch and then kick the ball that is coming toward you – there would be three object-relative zero-points involving eyes, hands, and foot– all coordinated by an articulated and dynamically changing body schema rather than any one stationary zero-point. Mathematically, of course, $0(n) = 0$; or $0+0+0 = 0$. But that's not the rule here. A plurality of zero-points is not equivalent to a zero-point; $0+0+0 =$ a bodily configuration.

The above-zero complexity increases when we fold in the other spatial frameworks identified by Bermúdez. When I reach to grab an object, as he indicates,

it is natural to suggest that the axes that determine particular proprioceptive frames of reference are centered on particular body-parts, just as are the axes determining the frames of reference for perceptual content and basic intentions. The picture that emerges, therefore, is of a number of different representations of space, within each of which we find representations both of bodily and of non-bodily location. So, for example, we might imagine reaching behavior to be controlled by an egocentric frame of reference centered at some location on the hand.... Despite its appealing economy, however, this account is ultimately unacceptable, because of a fundamental disanalogy between the bodily space of proprioception and the egocentric space of perception and action. (2005, p. 309).

Proprioceptive awareness of our own body is not egocentric – it's not oriented around an origin. Even haptic touch reflects this lack of a zero-point. Consider that I can attend to an environmental object with my haptic hands. With my hands I can shift attention from the tactile feel of the object to the temperature I experience on my skin, or from what the object feels like, to what my hand feels like as I move it on the object. In this case there is no one zero-point that organizes my exploration; nor is there any shift from one clearly defined point to another. If in our visual attention we were to shift from point A in the visual field, to point B in the visual field, one might think that a zero-point is formed at the vortex located near the eyes. If this is a zero-point, it's not the type of zero-point that could be associated with my hands' haptic touch. My hands, moreover, are involved in both my tactile and temperature attending experience that may be distributed across several fingers or several parts of my hand – they are not confined to one point, and they are not oriented around one point in anything like a vortex arrangement. Rather, as my body, my eyes, my hands move throughout this exploration it's a matter of a complex set of trajectories rather than any one zero-point.

What Merleau-Ponty calls reversibility, or the enveloping relations that characterize my body (1968, p. 260), disrupts any concept of zero-point. The kind of doubling of sensation in hand-touching-hand is not zero-pointed, but ambiguously distributed. In this case, attention does not originate in my head or chest; attention is in my hands; and my hands are not located in an egocentric spatial framework -- the lived-proprioceptive location of my hands belongs to a global proprioceptive spatial framework (Bermúdez, 2005; Gallagher, 2006). According to Merleau-Ponty, "the spatiality of the body must descend from the whole to the parts, my left hand and its position must be implicated in an overall bodily plan and must have their origin there" (2012, p. 101). The spatiality of the body "is not, like the spatiality of external objects or of 'spatial sensations', a positional spatiality; rather, it is a situational spatiality" (2012, p. 102).

One can say, as Merleau-Ponty does, that perception is indexed to the body as a center. But given how bodily space is organized, this is different from saying that it is indexed to a zero-point. A zero-point defined in objective, Cartesian or geometrical terms, cannot be found in the perceiving or acting body given the complexities mentioned above. As Bermúdez points out, the proprioceptive organization of the body is not equivalent to an objective geometry that one might associate with the egocentric frame of reference (1998, pp. 152-153). If, as he indicates, proprioception does not organize the differential spatial order of the body around an origin, this means that whereas one can say that this book is closer to me (my body) than that book over there, one cannot say that my foot is closer to me than my hand. As Merleau-Ponty puts it, "When the word 'here' is applied to my body it does not designate a determinate position in relation to other positions or in relation to external coordinates ..." it expresses "the situation of the body confronted with its tasks" (2012, pp. 102-103)

4. *Zero-points and self-location*

Despite all of these complexities involved in the sensory-motor aspects of perception and action it may still seem highly intuitive that our spatial experience is organized around a zero-point that we prereflectively experience as such. Indeed, there have been empirical and microphenomenological studies that claim to show that there is something like a zero-point, or a precise location of the experiencing self. Consider, for example, the study by Franco Bertossa et al. (2008). They used what is now called a microphenomenological, structured interview method to investigate where subjects would locate their perceiving I (the “I-that-perceives”). It turns out that a high percentage (83%) of subjects located their perceiving I in the temporal area of the head centered midway behind the eyes. Subjects included fifty-four (54) sighted western individuals, eight (8) blind subjects and five (5) non-western subjects. This looks like strong evidence that there is a phenomenological sense of a specific perceptual zero-point – precisely the kind of thing that Husserl was describing. Some of the details of the experiment, however, should lead us to discount this idea.

The interview procedure starts by asking about the location of objects in egocentric space, specifically asking about the distance of objects from one’s body. The interview then probes the subject’s sense of up and down, and then their sense of themselves as a perceiving subject. During the interview subjects are tested on their proprioceptive ability (with their eyes closed) to “recognize” various parts of their body. Just at this point, however, there is a subtle shift in the way the interviewer refers to the subject. The interviewer had been using the pronoun ‘you’. For example, the interviewer asks: “Can you tell me where the ceiling is with respect to you?” Or, “How close is this object to you?” The shift then occurs when the interviewer begins to reference “the I.” Indeed, it is an odd question that the interviewer asks: “Is your hand ‘I’, or does your ‘I’ perceive through your hand? Although the scare quotes around the ‘I’ appear in the textual report, it’s not clear what they signify, or how those scare quotes were handled during the interview. Using the idiom of ‘the I’ the interviewer then asks about the location of various body parts relative to the ‘I’. For example, the interviewer asks: “Is there a zone between your belly and your throat that you feel is closer [to the I]? Subjects then say that the throat is closer. Pursuing this line of questioning the subject is led to actually point to a location of the ‘I’ inside the head.

Although it is not absolutely clear in Bertossa et al. (2008), it seems that during the interview the I becomes reified and subjects are then asked to locate various body parts relative to this reified I, and finally to locate the I itself. One has to wonder whether the shift to talking about ‘the I’ isn’t similar to the shift made by Descartes between the *cogito* and the ‘*res cogitans*’. What would happen if the interviewer stayed with the pronoun ‘you’? The question would be something like the following: “Is your ankle closer to you than your chin?” It is quite possible to answer that question by saying “My ankle and chin are both part of me; one is not closer to me than the other.” Indeed, at least one subject tried to answer in this way by saying that “the I” corresponded to his whole body, at which point the interviewer asks him for an explanation: “why do you say that your ‘I’ coincides with your whole body?” to which the subject answers “I really have no idea.” (p. 332).

It's not clear, however, that this last 'I' (who has no idea) is the same 'I' that is being located.

In other words, it is not clear that such a reified 'I' is what Husserl discusses when he associates the lived body with the zero-point. I suggest that something about the prereflective nature of experience gets lost in the procedure of trying to locate the zero-point. Bertossa et al., however, have no doubt that the 'I' is "placed somewhere near the centre of [the] head. This seat corresponds to a 'point zero', the origin (0,0,0) point of a Cartesian spatial geometric framework, whose axes are defined by the subjects' experience of what lies closer or farther in front or behind, above, or below, where their sense of 'I' and their sense of 'here' are felt to coincide" (2008, p. 333).

Alsmith and Longo (2013, p. 71) note that "the inherent diversity and flexibility of multi-sensory integration processes" can lead subjects to locate the self in different locations in the body. They also note that the study by Bertossa et al. (2008) doesn't allow for this possibility. In their own study they asked subjects to adjust a pointer to indicate the experienced location of the self.

So which part of the body counts as you? Our results suggest that no single body part is judged as the unique seat of the self. Beyond a certain spatial resolution, self-location judgements are ambiguous between at least two locations, though when forced to judge this ambiguity can be resolved according to contextual factors. When asked to point directly at themselves, in both haptic and visual modalities, our participants' judgements were clearly affected by the starting location of the pointer. Participants most frequently chose to point to one of two likely parts of the body according to which they reached first, upper face or upper torso.... To the extent that such self-location judgements tell us anything about our concept of the self as a spatial entity, they tell us that the concept is inherently ambiguous. (Alsmith & Longo, 2013, pp. 73-74)

There are other studies that attempt to specify the location of the self. The self, of course, can be defined in numerous ways and in such studies the goal is not necessarily to find a zero-point-self. In some ingenious whole-body (or out-of-body) illusion experiments conducted by Olaf Blanke's group (e.g., Ionta et al, 2011), experimenters were able to manipulate the location of the first-person perspective and self-location where self is equated with the whole body. In their questionnaires they ask questions such as "How strong was the feeling that the body you saw was you?" In this respect, although they are asking about bodily location, they are not reifying the self. They found that activation in the left and right Temporal Parietal Junction (TPJ) correlated with changes in experienced changes in body location. In such whole-body illusion experiments where, for example, the subject feels as if they are floating, the first-person perspective follows the experienced body. One modulates the first-person perspective and self-location by manipulating tactile, visual, somatosensory and vestibular contributories, which implies that the first-person perspective is not simple, but is underpinned by complex processes. As Ionta et al. indicate, the TPJ integrates multisensory signals, and its "receptive fields are most often large and bilateral, may encompass the face, trunk, hemibody, or entire body, and have bimodal visuo-tactile receptive fields that are

anchored to the body” (2011, p. 371). But the TPJ, like the SC, is just one of a large number of brain areas activated for self-related phenomena (see Legrand & Ruby, 2009; Vogele & Gallagher, 2011). It may be closer to the truth to say that in whatever way we define the self it involves at least the whole brain together with the whole body (see Gallagher, 2013).

5. *Attending or acting with others*

Before I suggest a better way to deal with the complexity and ambiguity of the perceiving and acting self that the notion of a zero-point is supposed to fix, let me add one more complicated dimension. If one’s individual perception or action has a complex gestalt-like framing, this can be even more complex in cases of joint attention and joint action. We can think of joint attention as a “basic joint action” (Fiebich & Gallagher, 2013), and then consider that in most joint actions one needs to coordinate one’s movements with others. For example, as two people engage in moving a bookcase through a doorway all three spatial frames of reference identified by Bermúdez, *times two*, are involved. The coordination of my own two-handed grip, together with my general balance, together with my perception of the doorway through which we need to navigate, and whatever ongoing movements we might have to make to adjust the angle of the bookcase to ease it through, must be coordinated with your movements which in some instances may throw me off balance. In joint actions that involve two-person synchronic, correlated movement patterns, one’s lived body schema meshes with the other person’s to form a “joint body schema” – which involves an integration of one’s peripersonal space with the other’s (Soliman & Glenberg, 2014). This is an explicit case of what Merleau-Ponty calls *intercorporeity*, and it involves a complex gestalt of 3x2 spatial frames of reference rather than two individual or one collective zero-point(s).

Similar things can be said with respect to communicative interactions. Indeed, Jürgen Habermas makes a related suggestion, describing an organization of space surrounding two or more speakers. He suggests that it is the speech situation, encompassing two or more speakers, rather than the body of the individual subject, that is the center around which the context is ordered. We could think of this in terms of Merleau-Ponty’s concept of “situational spatiality.” In such situations, the first-person standpoint is really taken up into a second-person standpoint, in both an experiential and spatial sense, as we are speakers and actors *alongside others*.

The common speech situation constitutes the center – and not, for instance, my body, as an anthropologizing phenomenology has claimed – in which social spaces (staggered concentrically according to depth and width) and historical times (arranged three-dimensionally) converge prior to any objectivation through measuring operations.... I, in my body, and I, as my body, find myself always already occupying an intersubjectively shared world, whereby these collectively inhabited lifeworlds telescope into each other, overlap, and entwine like text and context. (Habermas, 1998, p. 244)

This “always already” situation of intersubjectivity complicates the concept of a zero-point and precisely points away from the very notion.⁴

To summarize, the idea of an experiential zero-point characterizing embodied spatial experience is not to be found in the sensory realm (vision, touch, etc.), in the motoric realm of action, in the realm of self-experience, or in the social realm of interaction, joint action, joint attention, or communicative interaction.

6. *The alternative: The agentic situation*

Let’s consider one more attempt to make sense of the notion of a zero-point, and then turn to an alternative proposal. Horgan and Nichols (2016) attempt to stay with the notion of zero-point (drawing from Husserl), but they almost immediately start to use the phrase ‘zero-point aspects’. For example, under this heading they include two of Bermúdez’s three spatial frameworks, allowing for (1) a plurality of zero-points (e.g., associated with hands in haptic exploration, and (2) the orientation framework (*à la* Taylor and Bermúdez).

For instance, the up/down axis of one’s visual-presentational experience seems heavily dependent upon certain aspects of tactile and kinesthetic sensory-perceptual experience: roughly, down is the direction of the surface to which one’s body at rest is attached, and toward which one’s body moves when unattached to any surface. This up/down axis [is involved in perception of] objects in the ambient environment as located within an implicit reference frame that includes the directions of up and down. The up/down axis also is a zero-point aspect of visual-perceptual experience. (Horgan & Nichols, 2016, pp. 149)

Recall, as noted by Taylor, the up-down axis involves not just bodily directionality, but also environmental constraints, such as gravity. Whatever this axis is, it experientially extends into the environment. Horgan and Nichols call this a zero-point aspect. They continue:

Some aspects of external-world-representing tactile experience seem *centered on one or several zero points* that coincide with certain specific body parts that themselves are also explicitly represented tactilely; for instance my tactile experience of the dumbbell’s shape seems centered on my two hands, one of which feels (via gripping) the cylindrical shaft and the other of which feels the shape of one of the weight-plates to which the shaft is attached. Other aspects of external-world-representing tactile experience—for instance, my tactile experience of the dumbbell’s heaviness, and my tactile experience of the balance of this

⁴ In contrast, Schutz and Luckmann borrow Husserl’s notion of the zero-point, the center of a system of spatial coordinates, use it to define what they term the ‘zone of operation’ (similar to George Herbert Mead’s notion of ‘manipulatory area’), and apply these concepts in social analysis (Schutz & Luckmann, 1973, pp. 36, 41ff).

heaviness on its two ends—seems centered upon a *zero point that coincides with my entire body* (Horgan & Nichols, 2016, p. 149; emphasis added)

Although they suggest that “[o]ne experiences being located at a specific sensory-perceptual zero point ...” -- it doesn’t seem that a zero-point aspect is a zero-point if it’s a *linear axis* or a trajectory in movement, or if it coincides with the *whole body*. In their insightful analysis of a number of phenomena, Horgan and Nichols define the notion of ‘zero-point aspects’ to signify those pre- or non-reflective aspects of self-experience that do not involve explicit self (I*) representation – but it is not clear what the concept ‘zero-point’ *per se* adds to their analysis, and it does not seem equivalent to their starting point in Husserl’s use of the term. Accordingly, I suggest that there is zero point to using the term ‘zero-point’ in such cases.

How then should we think of these specific aspects of spatial experience in perception and action? Should we take the various objections against the zero-point to be a mere terminological issue? I think it is more than a terminological issue. The point of questioning the zero-point concerns the role of the first-person embodied perspective and its phenomenology. The first-person perspective seems not to be reducible to a zero-point, and the lived body is more than a collection of zero-points; more also than a geometrical *res extensa*. It involves an experiential “thickness,” an ambiguity, as well as temporally attuned motor-control processes and situated affective processes that enable and delimit perception, and action. In contrast to an abstract origin-point anchoring the “thin” lines of a geometrical mapping of directional attention in perception or action, experience extends across a multitude of intersecting dimensions that include affective and interoceptive processes (De Preester, 2007; Tsakiris & De Preester, 2018), as well as multiple affordances that configure the agent’s situation (for example, what the agent can reach and grasp while keeping an eye on what she can’t yet reach and at the same time attending to what her partner can or can’t reach and grasp). Such aspects get lost in an analysis that focuses on the abstract concept of zero-point. This abstraction is reflected in the fact that, in the end, Horgan and Nichols revert to discussions of abstract cognitive architecture rather than embodied subjectivity to explain zero-point perspective – on their view such perspective is “cognitive-architecturally implemented by zero-point representations.”

What such an analysis and the notion of a zero-point itself overlook is what I’ll call, drawing on Merleau-Ponty’s notion of a “situational spatiality,” the notion of an *agentive situation*.⁵ The situation of an agent is not equivalent to the external environment; rather, the situation includes the agent *and* environment or the agent-in-environment. It’s defined in relation to the performance of actions structured by varying affordances and characterized by different time scales and degrees of and kinds of intentionality (Pacherie, 2008). Consider the example of initiating a tennis serve. In setting up the serve I may be marginally aware that I’m swaying back and forth on my feet which habitually transitions into a posture where the action of my throwing hand moves in close synchrony with the swing of my racket which is gripped in my other hand. My visual attention is on a specific zone

⁵ For a fuller explanation of this concept, drawing from John Dewey’s concept of situation, see Gallagher (2020, 1.2).

located on the other side of the net while at the same time I'm aware of my opponent's position and am anticipating my subsequent response to his return. Some interoceptive processes may be distracting me if my stomach is upset, or I have a painful injury that requires that I adjust my movements. Where should we locate the zero-point in this situation, which spans subpersonal processes of motor intentionality measured in elementary time scales of msec, integrative processes of present conscious intentions-in-action measured in seconds, as well as longer-term distal intentions that define it in terms of playing tennis to win? Even if we considered a postural snapshot of some moment of the action, unless we equate the zero-point with the agent's abstract center of gravity at that time-point, there is no one point on which to center the action; there is at the very least a complex set of coordinations – one foot in relation to the other, two hands in relation to each other while being in relation to ball and racket, respectively, while the agent is perceptually attending to a targeted zone and the other player. On this conception we should not think of the origin of the action as a zero-point; rather, experience originates in a relational system, the structure of which includes elements of the environment (and in this case social/intersubjective elements), and where a valenced world of affordances is already pushing and pulling a “thick and deep” embodied subject/agent characterized generally by affectivity, its own past history and future interests, and specifically by its ongoing material engagement, all of which figure into structuring perception and action.

This idea of the agentic situation is partially captured in three statements that we have already seen, from Merleau-Ponty, Taylor, and Habermas, respectively.

The movements of one's own body are naturally invested with a certain perceptual signification, they form *with the external phenomena a [well-articulated] system*. (Merleau-Ponty 2012, 49; emphasis added)

Our perceptual field has an *orientational structure* . . . It is not just that the field's perspective centers on where I am bodily—this by itself doesn't show that I am essentially an agent. . . . I have to maintain myself upright to act, or in some way align my posture with gravity. (Taylor 1978, 23)

I, as my body, find myself always already occupying an intersubjectively *shared world*, whereby these collectively inhabited lifeworlds telescope into each other, overlap, and entwine like text and context” (Habermas, 1998, p. 244)

The intertwining of multiple dimensions – cognitive, affective, motoric, perceptual, interoceptive, to name these factors in the most general terms – constitutes a situation that has no synchronic center, but is rather a matter of dynamical trajectories that intersect as a set of processes that involve zero zero-points. This is not to deny that there is a subject of perception or an agent of action, or that they are one and the same, experientially located in “active coordinates,” “in virtue

of the mutually structuring interrelation between his perceptual experience and his basic purposive interaction with the environment” (Brewer 1992, pp. 30-31).⁶

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⁶ In this respect, I think the enactive view that I am defending in this paper is very much in line with Bill Brewer’s argument that agency is the ground of self-location: “perceptual experience carries self-locating spatial contents in virtue of its role in controlling and coordinating [the agent’s] purposive interaction with the perceived environment, where two crucial aspects of this role are a reflection of the continuous dependence of the nature of experience on the changing position of the subject with respect to its objects and a sensitivity to the relevant biomechanical properties of the body in the production of appropriate spatial behavior (1992, 32).

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