



UNIVERSITY OF LEEDS

This is a repository copy of *Crossed wires about crossed wires: somatosensation and immunity to error through misidentification*.

White Rose Research Online URL for this paper:  
<http://eprints.whiterose.ac.uk/113188/>

Version: Accepted Version

---

**Article:**

Salje, L-C (2017) Crossed wires about crossed wires: somatosensation and immunity to error through misidentification. *Dialectica*, 71 (1). pp. 35-56. ISSN 0012-2017

<https://doi.org/10.1111/1746-8361.12170>

---

© 2017 John Wiley & Sons, Ltd. This is the peer reviewed version of the following article: Salje, L-C (2017) Crossed wires about crossed wires: somatosensation and immunity to error through misidentification. *Dialectica*, 71 (1). pp. 35-56 , which has been published in final form at <https://dx.doi.org/10.1111/1746-8361.12170> . This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Self-Archiving.

**Reuse**

Unless indicated otherwise, fulltext items are protected by copyright with all rights reserved. The copyright exception in section 29 of the Copyright, Designs and Patents Act 1988 allows the making of a single copy solely for the purpose of non-commercial research or private study within the limits of fair dealing. The publisher or other rights-holder may allow further reproduction and re-use of this version - refer to the White Rose Research Online record for this item. Where records identify the publisher as the copyright holder, users can verify any specific terms of use on the publisher's website.

**Takedown**

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing [eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk) including the URL of the record and the reason for the withdrawal request.



[eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk)  
<https://eprints.whiterose.ac.uk/>

# Crossed wires about crossed wires: somatosensation and immunity to error through misidentification

We have many ways of finding out about our bodies and their parts ‘from the inside’ — ways which we might naturally suppose are ways of knowing about our own bodies only. Gareth Evans lists these as ‘our proprioceptive sense, our sense of balance, of heat and cold, and of pressure’ (Evans 1982, p. 220), but it would be natural to expand our focus to all the ways we have of finding out about our bodies associated with the *somatosensory* system: a catch-all term borrowed from the biological sciences given to the family of senses for the detection of temperature, touch (pressure, fluttering or vibrations on the skin), nociception (pains of different kinds including dull, throbbing and sharp), sensations (itches, tickles), proprioception (perception of limb position through the detection of muscle length/tension and joint pressure/angle), and kinesthesia (perception of limb movement), among others.<sup>1</sup>

If it is right that somatosensory perception is an epistemic channel that is dedicated to a single object — that is, to one’s own body — then judgements made on it basis will boast of a certain kind of epistemic security. While I could be mistaken about the bodily property that I self-ascribe on its basis (say, I might mistake an intense itch for a pain), I cannot be mistaken solely in virtue of being wrong about whose body it is that I thereby know about. This amounts to the thesis that somatosensation is an epistemic source that issues in self-ascriptive judgments with immunity to error through misidentification relative to a use of the first person concept. A first person judgment, *I am F*, made on grounds *g* is immune to error through misidentification relative to the use of the first person concept *I* iff the following mistake is not possible: the subject knows by *g* that *something* is *F*, and goes wrong only in judging that the thing that she thereby knows to be *F* is herself.<sup>2</sup> The question addressed in this paper is whether somatosensation is a source of judgments with this kind of immunity.

Why would the thesis that somatosensation is a source of judgments with this modal epistemic

---

<sup>1</sup>For corresponding characterisations of the somatosensory system in scientific texts see Byrne and Dafny 1997, §2, chap 2, H. Autrum 1973, Moller 2003, chap 4, Schmidt 1977, chaps 2 and 3, and Nelson 2000.

<sup>2</sup>There is, of course, an immense literature on how the notion of immunity to error through misidentification is to be formulated, that I will not enter into here. The formulation just given is based on the original modal formulation given by Shoemaker, with standard amendments of relativisation to grounds and formulation in terms of judgments rather than statements. The formulation covers both sides of Pryor’s *wh-/de re* divide. (Shoemaker 1968, Pryor 1999). For a recent collection that highlights some of the complexities regarding formulations of immunity to error through misidentification see Prosser and Recanati 2012.

property be of interest if it turned out to be true? Claims to immunity to error through misidentification are normally taken to have a very particular kind of significance when attached to first personal judgment-kinds. They show that those judgments are formed on the basis of a form of self-knowledge through which the subject has a distinctively subjective perspective on herself. If there is no possibility of a misidentification, the idea is, then that is because the judgment's formation did not proceed *via* an identification in the first place. So there can be no question of the subject having apprehended something in the world under a non-first-personal mode of presentation and then identifying it, or picking it out, as 'me' (as she would put it) — an identification that would have brought with it the corresponding possibility of a *mis*identification. These are forms of self-knowledge, rather, through which the subject is delivered to herself directly *as* herself, in a distinctively first personal way.<sup>3</sup>

Most people think that introspection is like this. I couldn't know by introspection that someone is getting bored, but go wrong only in having judged on those grounds that that someone is me; if introspection is a way that I have of knowing that anyone is getting bored, it's a way of knowing that I am. Which — given the above — is to say that introspection is plausibly a non-identification involving form of self-knowledge, or a way that I have of knowing about myself as myself.

There's much less agreement on what we should say about self-ascriptive judgments based on somatosensory perception. In large part, that's because of the apparent conceivability of so-called *crossed wire cases*: thought experiments in which a subject is wired up to another's body in such a way that she has experiences as 'from the inside' caused by the other body, experiences that are subjectively indistinguishable from ordinary episodes of somatosensory perception of her own body.<sup>4</sup> These cases are used freely in the literature to show that unlike introspection, somatosensory perception does not issue in self-ascriptive judgments with immunity to error through misidentification; unlike introspective self-knowledge of mental properties, our somatosensory self-knowledge of bodily properties is not a way of knowing about ourselves as ourselves. If it turns out that some somatosensory judgments really are immune to error through misidentification relative to uses of the first person concept, that would be a significant result. It would bring bodily self-knowledge alongside introspective access to our mental lives as a way of knowing about ourselves *as* ourselves, and so overturn the historically dominant treatment of psychological self-knowledge over bodily self-knowledge as somehow affording us a more robust subjective perspective on ourselves.<sup>5</sup>

---

<sup>3</sup>This way of putting the significance of the immunity to error through misidentification of some first personal judgments is descended from Wittgenstein's original division between the use of 'I' *as object* and *as subject* Wittgenstein 1958, p. 57.

<sup>4</sup>The other main threat facing the thesis that somatosory judgments are immune to error through misidentification comes from empirical counterexamples, both pathological and clinically induced. For some recent examples of discussions of these empirical cases see, e.g., Mizumoto and Ishikawa 2005 Gallagher 2012, and work by Frederique de Vignemont — de Vignemont 2007, de Vignemont 2011, de Vignemont 2012. The focus of this paper is on crossed wire cases so I do not discuss these empirical cases here, but I think that de Vignemont has given a compelling case for thinking that they do not pose a serious threat to bodily immunity to error through misidentification either.

<sup>5</sup>A slightly different way of putting the threat from crossed wire cases is to say that even if somatosensation is a source of

There is a tendency in the literature on immunity to error through misidentification to give descriptively modest sketches of these crossed wire cases. The central aim of this paper is to show that once the cases' details have been filled in, it turns out that they do not constitute counterexamples to the immunity to error through misidentification of somatosensory judgments. In the next section I set out two stipulative assumptions around which these cases are typically built — what I will call the *phenomenological indistinguishability* stipulation and the *causal connectedness* stipulation. In that section I also identify two necessary conditions that the designer of a crossed wire case will need to show it to meet if it is to be a counterexample to the claimed immunity to error through misidentification of somatosensory judgments. The first is that the judging subject must really have made an error of misidentification; I call this the *misidentificatory error* condition. The second is that there must be no difference in epistemic grounds between the crossed wire judgment and an ordinary somatosensory judgment; I call this the *sameness of grounds* condition. Plausibly, designers of crossed wire cases think that the first two legitimate stipulations are enough, perhaps together with further ancillary assumptions, to secure the latter two substantive necessary conditions.

In §2 and §3, I show that there is an unbridgeable gap between the stipulative assumptions and each of the two substantive conditions respectively. These are independent arguments, and the success of either one would suffice to undermine the force of crossed wire cases. In §1, I say what that force is supposed to be.

First, though, a note about the limits of the paper. The question whether our ordinary ways of knowing about our own bodies 'from the inside' should be counted as ways of *perceiving* our bodies has been an historically live question, and it's not clear that everyone will be happy to give a single answer for all cases. It might, for instance, seem less controversial to assume a perceptual model of, say, proprioception — where there is clearly a fact about whether the property is instantiated that comes apart from the question whether the property *seems* to the experiencing subject to be instantiated — than of sensations, for which there might seem to be no seems/is distinction. And certainly the view that feeling sensations is a matter of apprehending the instantiation of a mental, rather than a physical, property is more his-

---

judgments with immunity to error through misidentification, crossed wire cases demonstrate the possibility of a faculty of *quasi-somatosensation*, that subsumes our faculty of somatosensation, where quasi-somatosensation is neutral on the identity of the source of the perception and its perceiver. If the faculty grounding our related judgments is quasi-somatosensation—even if all quasi-somatosensation in this world is ordinary somatosensation—this would be enough to establish an asymmetry between our knowledge of our bodily properties, and our knowledge of our mental properties, for which there could be no corresponding quasi-faculty. This way of framing the threat is more familiar from parallel debates in the literature on quasi-memory; cf. Shoemaker 1970 and Evans 1982, §7.5. In keeping with those debates, quasi-somatosensation would be defined by the following three necessary conditions: (1) subject S has somatosensory impressions of physical event *e*; (2) *someone* is undergoing *e*; and (3) the impressions in (1) are caused *in the right kind of way* by *e* in (2), where 'in the right kind of way' is glossed as a causal connection that is *as similar as possible to the causal connection involved in ordinary somatosensation* consistent with the non-identity of the subject undergoing *e* in (2) and the subject having impressions of *e* in (1). I take it that my arguments in §2 will work equally well against this way of putting the threat, if translated into arguments that the *causal connectedness stipulation* does not suffice to establish that this 'right kind of way' condition in (3) is met. Thanks to an anonymous reviewer for raising this point.

torically prevalent than a purely mental account of what it is to feel crossed legs ‘from the inside’. These are vexed questions, and not ones that I will not enter into here; that is one of the limits of this paper. I will assume a uniformly perceptual model of somatosensation and its submodalities. Relatedly, I assume that any somatosensory self-ascription is the self-ascription of a perceived bodily property, rather than of an introspected mental property. I take it that in assuming a perceptual model of somatosensation, I am siding with a view that has contemporary currency, even if not historically dominance.<sup>6</sup> A final preliminary to note is that although the biological sciences recognise somatosensation as a perceptual system made up of a cluster of submodalities, I will often talk — harmlessly I think — as if it were a single perceptual system. I make finer-grained distinctions where appropriate.

## 1 Crossed wire cases

Crossed wire cases are designed to target the claim that a first person judgment, *I am F*, made rationally on the grounds of somatosensation, is such that the following mistake is not possible: the subject knows by somatosensation that *something* is *F*, but has gone wrong only in judging that the thing that she thereby knows to be *F* is herself. This is the claim that somatosensory judgments are immune to error through misidentification relative to their first personal components. What would such cases need to show in order to be counterexamples to that claim? They would need to illustrate the following possibility — that a subject could rationally form a judgment *I am F* on the grounds of somatosensation, and know on those grounds that *something* is *F*, but be wrong in judging it to be herself that she thereby knows to be *F*. There are at least two (related) necessary conditions here:

*Misidentificatory error condition:* The subject must know, on the relevant grounds, that *something* is *F*, but be mistaken in judging on those grounds that *I am F*

*Sameness of grounds condition:* The grounds for this judgment must be somatosensory perception

These conditions fall out directly from our formulation of immunity to error through misidentification, but it will be helpful to say a word or two about why they are important. I take each in turn.

It would be difficult to exaggerate the importance of the *misidentificatory error* condition. If crossed wire cases are to show by counterexample that somatosensory judgments are not immune to errors through misidentification, then they must offer a somatosensory judgment that *is* in error through misidentification. However the details of the case are filled in, then, the very first thing the case must do is establish that the judging subject is making an error of misidentification.

---

<sup>6</sup>See, e.g., Armstrong 1962, Armstrong 1968, Pitcher 1970, O’Shaughnessy 1980 (vol 1, chap 5), Martin 1995, Tye 1995 Tye 1997, Bermudez 1998, Dretske 1995, Dretske 1999, Crane 2003, Smith 2006, O’Brien 2007, chap 10, Schwenkler 2013, de Vignemont 2015 (§3), Richardson 2015. (See Gallagher 2003 and Aydede 2009 for recent exceptions; both authors position themselves against current orthodoxy).

The *sameness of grounds* condition states that the grounds exploited by the judging subject in these cases must be somatosensory perception. This is to say that they must be of the very same kind as the grounds we normally exploit when we form judgments about our bodies by perceiving them ‘from the inside’. After all, somatosensation is the faculty we are interested in testing with these cases. If it turned out that the judging subjects in crossed wire cases made use of epistemic grounds other than somatosensation to form their judgments, then we could no longer use those cases to tell us anything about what our faculty of somatosensory perception is like.

How do crossed wire cases fare with respect to these two conditions? It’s hard to say. The cases are often given somewhat perfunctory descriptions, even by their opponents. By now the idea might be these are familiar bits of argumentative machinery, and we know well enough how to go about filling them in. But we find the same descriptive austerity in early examples — take, for instance, Evans’ brisk introduction of them as:

the possibility of a deviant causal chain, linking the subject’s brain appropriately with someone else’s body, in such a way that he is in fact registering information from that other body. (Evans 1982, p.221)

Or Armstrong’s description of the relevant cases as those in which we:

become aware e.g. of another’s limbs, in much the same sort of way that we become aware of the motion of our own limbs (Armstrong 1984, p.113)

Or to give a more recent example, in the context of a discussion about whether a complete account of immunity to error through misidentification should rule out identification-involving background presuppositions, Wright states that:

in bizarre but possible background circumstances I may need to have information that I am not, today, being smitten with proprioceptive experiences originating from someone else’s body. (Wright 2012, p.272)

There’s nothing atypically descriptively ascetic about these examples.<sup>7</sup>

It wouldn’t do to simply stipulate that the above two conditions, *misidentificatory error* condition and *sameness of grounds* condition, are met in these thinly described scenarios — we would have no way of telling whether those stipulations served to carve out a genuine metaphysical possibility. Indeed, we might just as well simply stipulate that the possibility ruled out by the claim that somatosensory judgments are immune to error through misidentification relative to uses of the first person concept *isn’t* ruled out. If we are to show that crossed wire cases really do amount to illuminating counterexamples to that claim then we will need to fill in some of their details.

---

<sup>7</sup>For more examples of recent crossed wire cases see, e.g., Cassam 1997, p. 62, Coliva 2002, p. 28, O’Brien 2007, p. 206, Chen 2011, p. 29, de Vignemont 2012, p. 226, Prosser 2012, p. 178, Guillot 2014, n.8, García-Carpintero forthcoming, pp. 19-20

There are some elements of these cases that we can take for granted. It is a fixed feature of these cases, for instance, that the judging subject forms her judgment on the basis of an experience that has been caused by states of, or events happening in, a body distinct from the subject's own. Let's call this the *causal connectedness stipulation*. Without the causal connectedness stipulation it would be an open possibility that the experience was caused in the normal way by states of and events in the subject's own body. There could then be no chance of a misidentification error arising.

Another fixed feature is that the judging subject's experience must be phenomenologically indistinguishable from an ordinary episode of somatosensory perception. This is the *phenomenological indistinguishability stipulation*, and it is motivated in at least two ways. The first is that it is needed to secure the rationality of the subject's self-attribution of the experienced bodily property. For it is clear that if the judging subject's experience of the other body was noticeably different from her ordinary experience of her own body, then she would be able to simply read off from the phenomenological content of the experience whether it was the other body or her own that was featuring in her experience. She would then have no reason to form a first person judgment on the grounds of a crossed wire experience, because it would be phenomenologically salient to her that it was not her body in question. Of course, to be a counterexample to the claimed immunity to error through misidentification of somatosensory judgments, the subject *must* form a first person judgment — one that is in error through misidentification relative to its first personal component. But without the phenomenological indistinguishability stipulation in place, we would have to put the formation of this judgment down to a failure of rationality. The subject's judgment would then be so disconnected from its purported grounds that we would no longer hope to learn anything about those grounds by looking to that judgment. The second reason to stipulate phenomenological indistinguishability is because without it, it's hard to see how the case could have any hope of meeting the *sameness of grounds* condition. Whether or not phenomenological indistinguishability is sufficient for sameness of grounds, it is at least surely necessary.

Here is a crossed wire case with these stipulated features.

*Basic Case:* Ann has been kidnapped. Unbeknownst to her, her kidnappers have wired her up using a complicated system of cables to another of their kidnap victims, Bob. While they are hooked up in this way, Bob has a tickle in his nose that causes Ann to have an experience on the basis of which she rationally judges *there's a tickle in my nose*.

The idea is as follows. Ann's first person judgment *there's a tickle in my nose* is formed on the basis of somatosensory perception. Unlike our ordinary somatosensory judgments, however, it seems that Ann has misidentified her judgment's object; it's really *Bob's* nose and not hers that is ticklish, and that she knows on those grounds to be so. So Ann demonstrates the possibility of a first person somatosensory judgment that is in error through misidentification relative to its first person component — she knows, on the grounds of somatosensory perception, that *someone's* nose is ticklish, but makes the mistake only of judging it to be hers. Put another way, the idea is that the described scenario in *Basic Case*,

together with a few further plausible ancillary assumptions, is enough to secure the above two necessary conditions on being a counterexample to the claim that somatosensory judgments are immune to error through misidentification: Ann has committed a misidentificatory error (*misidentificatory error* condition), and she has done so on the basis of somatosensory perception (*sameness of grounds* condition).

In the rest of this paper I argue that this is to overestimate the force of *Basic Case*. There is no harm in describing a scenario that meets both the *causal connectedness* and *phenomenological indistinguishability* stipulations, as I have done in *Basic Case*—there is nothing obviously conceptually problematic about a case so described. The problem for proponents of crossed wire cases, however, is that such descriptions don't suffice to establish that either of the above two substantive conditions are met. In the next section I show why we cannot legitimately move from the facts described in *Basic Case* to the claim that the *misidentificatory error* condition is met, and in §3 I do likewise for the *sameness of grounds* condition. Designers of crossed wire cases cannot simply stipulate that these conditions are met, but neither can they show that they follow from the stipulations that they *are* allowed to help themselves to.

## 2 Meeting the *misidentificatory error* condition

The *misidentificatory error* condition says that the subject must know on the relevant grounds that something is *F*, but be mistaken in judging on those grounds that she herself is. As we saw above, showing that there can be an error of this kind made on the basis of somatosensory perception is the primary task of crossed wire cases. If it is to be a substantive result, however, then designers of crossed wire cases cannot simply stipulate that their described cases involve errors of this kind. Rather, they must show that the presence of such an error is implied by the conceptually unproblematic assumptions about the case as captured by *Basic Case* above.

One reason to think that designers of crossed wire cases are on a strong footing here is because we have already seen that they can help themselves to the *causal connectedness* stipulation; it's written into these cases from the start that the experience that grounds the subject's judgment is caused by states and events happening in someone else's body. It might seem like a small step from here to the claim that on the basis of that experience, the subject knows that *someone* is instantiating a particular bodily property, but has made a mistake in judging it to be herself. That's because the *causal connectedness* stipulation might seem to be enough to secure the claim that the experiencing subject is *perceiving* the other body, rather than her own. And if that's right, then it also seems right to say that she will have made a misidentificatory error if she goes on to self-ascribe the bodily property that she thereby knows about. I have no objection to this last claim—if Ann really is perceiving Bob's body, then in forming a first person judgment on those grounds she has committed an error of misidentification. In this section, however, I argue that the preceding move from causal connectedness to genuine perception amounts to a much bigger step than it might at first seem. And it's not one that I think the crossed wire designer



can take without falling back to brute stipulation.

To see why this is, it will be helpful to say a bit more about what Ann's experience in *Basic Case* must be like. Her experience is surely as of a single body-space. This is crucial, since any proliferation of experienced body-spaces 'from the inside' would alert Ann to the unusualness of her situation, such that it would be rational for her to withhold from making any first person judgments on the basis of those experiences until she finds out more about what is going on. For the same reason, let's add that the nose is experienced as bearing all the same spatial relations to other felt body-parts and to felt bodily boundaries as in an ordinary episode of somatosensory perception — these details are all mandated by the *phenomenological indistinguishability* stipulation. For good measure, let's put her in the dark and immobilise her, so as to avoid calibration through vision or action-knowledge that might interfere with her formation of the first person judgment.

Does the *phenomenological indistinguishability* stipulation also mandate that Ann's experience has *de se* content, that it is as of *my* nose (as Ann would put it) rather than as of *a* nose? I think it does. To see why, suppose that it doesn't. Suppose that Ann's experience is itself neutral about whose nose the experience is of; the content of the experience is *tickle in a nose*, or perhaps simply *nose-tickle!* The idea must then be that Ann's transition from this person-neutral content to a first person judgment is rationally motivated by something additional to the experience's content, perhaps by a kind of habitual toggling between experiences gained in that way and uses of the first person concept.<sup>8</sup> Here's a reason to think that this description of the experience won't do.

The problem with allowing that Ann's experience could be person-neutral begins by noticing that somatosensation is unlike a distal sense like vision insofar as there is no privileged position on the body counting as its perceptual point of origin; somatosensation is a non-perspectival sense modality. This is not a new idea. J.L. Bermudez, for example, explains:

[There is] a fundamental disanalogy between the bodily space of proprioception and the egocentric space of perception [...]. In the case of vision [...] there is a perceptual field bounded in a way that determines a particular point as its origin. [...] But our knowledge of our own bodies is not like this at all. It is not clear what possible reason there could be for offering one part of the body as the origin of the proprioceptive frame of reference. (Bermudez 2005, p. 309)<sup>9</sup>

When I look down and see my ankle, I see it as located at a certain distance and angle along an axis orig-

---

<sup>8</sup>This way of seeing things has connections with what François Recanati might have in mind when he describes proprioceptive experiences havingthetic content, and the rationality of the transition to a first person judgment being supplied by the experience's 'mode' — something akin to attitudinal force. (See, e.g., Recanati 2012, Recanati 2009, Recanati 2007). It's not clear, however, how deep the disagreement is between this part of Recanati's picture and my concluding claim in this argument, which is that Ann's experience cannot be neutral as to whose body she is perceiving. That claim is compatible with the idea that the first personal aspect of the experience is contributed by its mode. The imagined opponent here is someone who thinks that bodily awareness could fail to have a first personal aspect at all — cf., e.g., O'Brien 2007, pp. 206-9.

<sup>9</sup>Bermudez's claim is about proprioception, but I take the observation to generalise across all the senses involved in the somatosensory system (other than bodily feelings; see fn.7). For other recent discussions on this point see Smith 2002, Soteriou 2013, and Gallagher 2005.

inating from my eyes. When I feel a pain in my ankle, by contrast, there is no centralised physiological mechanism analogous to the optic system from which the pain is perceived. More generally, there is no significant point of origin from which somatosensory perceptions are had. The internal body-space itself constitutes a region that is both perceivable, and from which internal bodily perceptions are had: the body and its parts are both object and organ of somatosensation. As Bermudez points out, support for this claim comes from noticing that it makes little sense to ask of two somatosensorily perceived objects, which of these objects is further away? Or, do they both lie in the same direction? The reason for this, he explains, is because these questions both implicitly assume an origin-centred structure; '[t]he conclusion to draw from this is that the spatial content of somatic proprioception cannot be specified within a frame of reference that takes the form of axes centered on an origin.' (Bermudez 1998, p. 153)

This structural difference between vision and somatosensation is hardly surprising given the anatomical differences between the physical systems that sustain them. In the case of vision, several million photoreceptors are gathered on the retina to absorb incoming light particles from outside the eye. By contrast, the somatosensory system is comprised of receptors distributed with differing concentrations throughout the body, over muscles, bones, skin, epithelial and connective tissues and internal organs, which harvest information from the body parts in which they are located. Our sensitivity to muscle stretch, for instance, is due to muscle spindles, or small encapsulated sensory receptors, positioned throughout each of our muscles in varying levels of density that serve to detect any changes in the state of the muscle's extension. The body-part serves at once as perceptual object and organ. No wonder, then, the non-perspectival structure of somatosensation.

If Ann's experience is to be phenomenologically indistinguishable from an ordinary episode of somatosensory perception, then it must be indistinguishable for her from an experience gained through the exercise of a non-perspectivally structured perceptual modality.<sup>10</sup> But if that's right, then her experience cannot remain neutral about whose body it is. If a single body-space appears to her to be both the body-space perceived and the position from which the perceiving is done, then the perceived body-space must seem to her to be that of the perceiving subject. It's hard to see how we could hold to that requirement without also granting her experience *de se* content; she cannot experience a body-space as belonging to the subject of that very experience without experiencing it as belonging *to her*. The experience must be, as Ann would put it, as of *my* nose being ticklish. I don't think there is anything in this that the crossed wire designer need take objection to.<sup>11</sup>

Here are the facts on the ground as we currently have them regarding *Basic Case*. We know that an

---

<sup>10</sup>I take up the question whether it must in fact *be* non-perspectivally structured later.

<sup>11</sup>This argument makes contact with, but does not take a stand on, the debate on the sense of ownership. All the main participants in that debate agree that we experience our bodies *as ours*; their dispute is centred on the question whether or not this is to be understood as a special positive ownership quale. (See, e.g., Bermúdez 2015, de Vignemont 2013, Martin 1995.) In this argument I undertake a commitment to the starting ownership datum, that through somatosensory perception we experience our bodies as our own, but not to any particular account of it.

event happening in the region of Bob's nose causes Ann to have a *de se* experience of her nose being ticklish. We know that this experience is phenomenologically indistinguishable for Ann from an ordinary episode of somatosensory perception. We certainly know that on the basis of this experience Ann goes on to form the first person judgment, *there's a tickle in my nose*, and we assume that this transition was a rational one. Do these facts suffice to establish that Ann is really somatosensorily perceiving a tickle in Bob's nose, and so that her judgment is in error through misidentification relative to its first personal component? They don't. That's because these facts on the ground don't yet give us any reason not to take Ann's report of a *de se* experience at face value.

The problem for the designer of the crossed wire case here is that the details of the case as sanctioned by our two legitimate starting stipulations do nothing to rule out the possibility that this really *is* an ordinary self-directed episode of somatosensory perception that Ann has of her own nose, albeit one with an unusual causal history. The sensation would admittedly be very unlike many of her ordinary sensations, insofar as its recent causal history can be traced back via an event happening in Bob's body. But we don't yet have any reason to grant the sensation in Bob's nose any more elevated a status than we give to other causal antecedents of Ann's experience in the crossed wire case — the prior event of a feather brushing Bob's nose, say, or the movements of the kidnapper's feather-clasping hand in its approach to Bob's nose — or that we give to the ordinary causal antecedents of her ordinary sensations. We are certainly not forced by the details of *Basic Case* to say that Ann and Bob are both using somatosensory perception as a way of finding out about a single event happening in Bob's nose at the same time; that like for Bob, it is Bob's nose that features directly in Ann's somatosensory experience. Rather, given the *de se* content of her experience, a much more likely description of the case is that the tickle in Bob's nose has caused Ann to have a coordinate sensation of ticklishness in her own nose — the experiment's wiring system is, to borrow a line from Martin, 'nothing more than a sophisticated mechanism for causing [tickles] in two people instead of one' (Martin 1995, p.276). There would be no mystery on this reading of the case about the experience's phenomenological likeness to an ordinary episode of somatosensation. Ann really *is* engaged in an ordinary episode of somatosensation. It's just that it was brought about in rather an unusual way.<sup>12</sup>

It won't help the crossed wire case designer here to add the detail that Ann experiences the sensation as being located at the objective spatial coordinates currently occupied by Bob's nose — to build into the case, for example, that she would point to Bob's nose if asked where tickles. It's not that there need be a conflict here with the *phenomenological indistinguishability* stipulation. Even if the experience is a bit strange, the designer could still rightfully insist that the experience will be phenomenologically in-

---

<sup>12</sup>This argument does not rely on any controversial assumptions about the metaphysics of bodily ownership; the claim is merely that Ann might be perceiving the very nose that she would ordinarily perceive in a non-crossed wire episode of somatosensation — viz., the object that biology would recognise as her own nose. In particular, it does not rely on anything like what Quassim Cassam calls the Lockean view of bodily ownership, on which one's body is constituted of the body in which it is possible for one to feel sensations Cassam 1997, pp. 63-6. Thanks to an anonymous reviewer for raising this point.

distinguishable from an ordinary episode of somatosensory perception. It will just be indistinguishable from an episode of somatosensory perception in which the subject is suffering from an illusion about her body's shape, size or position. The problem, rather, is that nothing in this reading of the case rules out that Ann is having an (illusory) experience of her own nose, within the context of an (illusory) experience of her own body-space. The wiring system is now not only a sophisticated mechanism for producing tickles in two people instead of one, but also of producing elaborate illusions in one of those subjects with respect to their bodily dimensions. In other words, when Ann says that she is experiencing a tickle in her nose, we don't yet have any reason not to take that report of a self-(mis)perception seriously. None of the ways of reading the case considered so far gives us any reason to think that Ann has made an error of misidentification in her first person judgment *there is a tickle in my nose*.

The crossed wire proponent needs to give us reason to reject these readings, and to instead see the causal connection between Ann's experience and Bob's nose-tickle as constituting a genuine perceptual link — one that will underwrite a misidentificatory error on Ann's part, and so ensure that the *misidentificatory error* condition is met. Here's one thing she could try. She could invite us to think more carefully about the envisaged wiring mechanism linking Ann to Bob. One way it might work is by stimulating nerve endings in the perceiving subject's relevant body-part; in this case, Ann's nose. Quite right, the designer might allow, that if this is how we are imagining the case then we must think of Bob's nose-tickle as causing an independent sensation of ticklishness in Ann's. But here's another way it might work: by artificial stimulation of the relevant areas of the perceiving subject's brain. (This set-up is suggested, for instance, by Evans's earlier description of the case). It's much less obvious on this way of arranging things that Ann is still (mis)perceiving her own nose. After all, we now have a mechanism before us that produces sensory experiences in Ann that reliably track how things are with Bob, that doesn't work by stimulating her own body-parts. Isn't this enough to count as perceiving Bob's body?

The crossed wire designer ought, I think, to be cautious in taking up this suggestion. She will have to be prepared to argue that *all we need* for genuine perception is a mechanism that tracks how things are in some region of space through the production of sensory experiences. This is an extremely thin notion of perception, and one we would need good reasons to accept. And for fear of question-begging, those reasons would have to have nothing to do with crossed wire cases.

Consider the following scenario that seems to tell against such a notion. Suppose there is an apple on the table in the next room, far out of range of my normal sight. The apple is fitted with a scanning device, attached by a long wire to my visual cortex. Immediately in front of me is a colourful fruit-bowl containing oranges and bananas, but no apples. On the flick of a switch the apple is scanned, and the device sends signals to my visual cortex that cause me to have an experience subjectively indistinguishable from a visual perception of an apple among the other fruit in the bowl. Am I seeing the apple in the next room?

Not, I take it, in any normal sense of 'see'. The apple certainly plays a lead role in the causal his-

tory of my experience. But it is not causally connected to the production of that experience in the way characteristic of the objects of ordinary visual perceptions. Maybe — if it was independently important to us — we could find a way to hold on to a description of the case as one of ‘seeing’ the apple, with enough semantic stretching of the term. But once the subject’s eyes are taken out of the causal picture, and the experience is proximately caused by poking around in the subject’s brain, the case is much more comfortably described as a neurologically induced visual hallucination, even if it is an hallucination that reliably tracks how things are with the apple next door.

Likewise with Ann’s case. Let’s suppose that instead of being caused by bodily stimulation, where the body and its parts serve as both object and organ of perception in the normal way, Ann’s experience is caused by artificial manipulation of her somatosensory cortex. Let’s suppose, moreover, that the precise patterning of the prodding in Ann’s brain is determined by events happening in Bob’s body in such a way that the somatosensorily experienced body-space is spatiotemporally isomorphic to Bob’s actual body-space. Is this a way for Ann to somatosensorily perceive Bob’s nose? Perhaps there will be a way to argue that it is, if we had some motivation independent from our intuitions about crossed wire cases for stretching what we mean by ‘somatosensory perception’ this far. But absent such motivation, the case is much more comfortably described as a neurologically induced somatosensory hallucination, even if it is one that reliably maps on to states and events happening in Bob’s body-space. And we certainly have no principled reason to rule that reading out. Ann’s judgment is now in error for sure, but for all that the case has established so far, not in virtue of a misidentification.<sup>13</sup>

How would things look if we changed the self-ascribed property to a proprioceived property? What if, for instance, keeping all other details fixed in *Basic Case*, Ann judges not *there’s a tickle in my nose* but *my arm is bent*? Proprioception, understood as the sense of static limb position, is a submodality of somatosensation that is itself a multicomponential sensory system. For the most part, impulses from various types of peripheral receptors in the skin, muscles and joints in the subject’s limbs and trunk are carried through the spinal cord to the brainstem, where they cross over to the contralateral cerebral cortex. This means that when Ann judges that *my arm is bent* in an ordinary case of somasensation, that judgment is based on the synthesis of information coming into her cerebral cortex from a collection of different local nervous systems. Suppose now that the wiring system in *Basic Case* works by connecting body-part to body-part. In that case, what we are imagining is that the impulses coming from a cluster of different receptors in Bob’s arm (skin, muscles, joints) are diverted — or perhaps, branched — into the artificial wires so as to stimulate the exactly matching receptors in Ann’s arm, in such a way that they send information up the relevant pathways to her sensory cortex that lead to a conscious personal-level experience on the basis of which she forms the first person judgment, *my arm is bent*. Even if Ann’s

---

<sup>13</sup>This does not rule out the possibility that the sensations caused by the wiring system will end up *contributing* to a way Ann has of knowing about Bob’s body; e.g. an inferential knowledge-source involving both Ann’s sensations and her testimonial knowledge of a reliable correspondence between those sensations and how things are in Bob’s body. But this would be to shift Ann’s epistemic grounds, and so to violate the *sameness of grounds* condition.

experience is caused in rather an unusual way, so long as these receptor-stimulations in her arm send the relevant information through Ann's peripheral nerves into her spinal cord and into the relevant cortical areas of Ann's brain, it's hard to see how else to understand it than as a proprioceptive (mis)perception of her own arm. That's so even if the causal deviancy of the events leading up to that (mis)perception leads her to misrepresent the arm's position. Ann's judgment is in error, but not through a misidentification.

Suppose now that instead of linking body-part to body-part, the wires function by connecting Bob's arm to Ann's cerebral cortex. The patterns of impulses in the receptors distributed throughout Bob's left arm now cause signals to be sent up the attached wires, and in turn to cause Ann's cerebral cortex to be stimulated to generate precisely the same patterns of activation that would result from an ordinary proprioceptive perception of her own arm being bent. Ann has a person-level conscious experience as of her own arm being bent, and goes on to form the first person judgment, *my arm is bent*.

If this second version of the set-up is to satisfy the *misidentificatory error* condition, then we must show that it suffices for genuine perception of Bob's arm, on the basis of which Ann knows that *someone's* arm is bent but is wrong only in judging it to be her own arm that is. To do that, we must insist that the role that Bob's arm plays in causing Ann's experience is enough to elevate it to the status of her object of perception. But why should we allow this causal antecedent of Ann's experience any more privileged a status than any other? To bring the point out, consider the following variation of the case. Suppose now that instead of connecting Bob's arm directly to Ann's brain, her kidnappers connect it to a computer that calculates the precise areas of the brain that *would* be activated by his arm-bend. One of the kidnappers, an apprentice neuroscientist, now uses this information to manually stimulate those very areas of Ann's brain. Ann has a personal-level conscious experience as of her arm being bent, and goes on to form a first person judgment about it. Clearly, Ann does not thereby perceive the neuroscientist-kidnapper, even if he is the proximate cause of those patterns of brain activation; mere causation does not suffice for perception. Rather, Ann now has a neurologically induced hallucination as of her own left arm being bent. The only difference between this scenario and our previous crossed wire case is that her patterns of brain activation were before being caused by signals delivered by wires connected to Bob's arm, rather than by signals delivered directly into her brain by the neuroscientist-kidnapper. Is this difference reason enough to treat these two cases differently with respect to the question whether Ann is having a neurologically induced hallucination? Once Ann's brain activation is caused by anything other than impulses carried through the ordinary spinal pathways from her peripheral nerves, it seems much more natural to treat the activation in both of these variations of the case as something other than genuine perception. There is no misidentificatory error on this second set up of the case, not because Ann is right about who she has perceptual knowledge of, but because on this version of the case Ann does not have perceptual knowledge of anything at all.

Even adding these supplementary details about the functioning of the wiring system to the starting stipulations in *Basic Case*, then, those stipulations are not enough to establish that the *misidentificatory*

*error* condition is met. In the next section I will argue that they are not enough to secure the *sameness of grounds* condition either. Of course, the designer could simply add as a brute detail of the case that on the grounds of her somatosensory perceptual episode, Ann knows that something is *F*, but makes a mistake in judging it to be herself. But the case would then have only as much force as the bare stipulation that somatosensory bodily self-ascriptions are vulnerable to error through misidentification relative to their first personal components.

I turn now to the *sameness of grounds* condition.

### 3 Meeting the *sameness of grounds* condition

The *sameness of grounds* condition says that the grounds on which Ann's misidentificatory error occurs must be somatosensory perception, grounds of the very same kind as those we ordinarily exploit in our somatosensory judgments. Again, if these cases are to be effective, then their designers cannot simply stipulate that this condition is met. They must show that it is implied by the details of *Basic Case*. One way the designer might try to reach this result is by appeal to the starting *phenomenological indistinguishability* stipulation. According to this stipulation, Ann's crossed wire experience is phenomenologically indistinguishable from an ordinary episode of somatosensation. So as long as we are happy to slice epistemic grounds only as finely as their phenomenological content, this will be enough to secure the claim that Ann is undergoing an episode of somatosensation. It takes very little, on this way of putting things, to move from the *phenomenological indistinguishability* stipulation to meeting the *sameness of grounds* condition. In this section I will suggest that we, and the crossed wire designers themselves, have reason not to make that move.

To meet the *phenomenological indistinguishability* stipulation, Ann's crossed wire experience must be phenomenologically indistinguishable from an ordinary episode of somatosensation. We saw earlier that one of the distinctive features of ordinary somatosensation is its non-perspectival structure. There is normally no distance between the position perceived through somatosensation and the position from which it is perceived; the body and its parts serve as both object and organ of perception. To meet the *phenomenological indistinguishability* stipulation, then, Ann's experience must be indiscriminable from a non-perspectivally structured perceptual episode. But notice that even if we grant that her experience is phenomenologically indistinguishable from a perceptual episode had through a non-perspectival perceptual faculty, and grant (*contra* the last section) that she really is perceiving Bob's nose, her perception cannot actually *be* non-perspectivally structured.

Why not? Well, *ex hypothesi* Ann's experience is caused by states of, and events happening in another's body. That much is mandated by the *causal connectedness* stipulation. We saw in the last section that if the crossed wire case is to be effective, its designer must find a way to convince us that this causal connection constitutes a genuine perceptual link. Suppose she succeeds in doing this. It will then be an

important part of the argued case that Ann is remotely perceiving Bob's body. Which means that it will be an important part of the argued case that the perceptual point of origin — which must surely be with Ann, the perceiving subject — is at a distance from the body-part being perceived. And, of course, this is just what it is to be perspectively structured. The same point can also be put another way: a crossed wire experience could not become non-perspectively structured without a corresponding shift in perceiver. That's because only Bob can actually perceive his own body from the inside *at no distance*, since only Bob is co-located with the perceived body-space. So we could not insist that the perceptual state is in fact non-perspectival without restoring Bob, and not Ann, as perceiver.

So unlike ordinary episodes of somatosensation, Ann's perceptual state is perspectively structured — though in keeping with the *phenomenological indistinguishability* stipulation this structural feature of the episode is screened off from Ann herself. By itself, this needn't undermine the *sameness of grounds* condition. After all, as Martin points out, 'we do not tend to think that the use of spectacles, or even the use of binoculars or telescopes, prevents us from genuinely seeing objects through them' (Martin 1995, p.277). Why think that a prosthetic device extending the range of somatosensation beyond its normal scope will prevent a subject from enjoying a state of genuine somatosensory perception, of the very same kind as she ordinarily has of her own body? There is no immediate inconsistency in accepting the perspectival difference between ordinary somatosensory episodes and crossed wire experiences, while at the same time holding that they are different exercises of the same perceptual faculty. How, then, *should* we settle the question whether these are grounds of the same kind?

It's hard to know how to non-stipulatively resolve individuation questions for epistemic grounds, and it's not clear that there will be any good general answers to that question that aren't relativised to particular purposes for asking it. In this case, however, we have reason to think that crossed wire designers themselves should treat the difference just raised between crossed wire experiences and somatosensation as a difference that matters. That's because the difference between somatosensory perception and crossed wire episodes is not like the difference between ordinary vision and looking through a telescope. It involves *structural distortion* rather than mere extension in range. And for the purposes of the present discussion, this gives us reason to agree that the judgmental grounds that they respectively provide are distinct.

Here's why. The issue standing between defenders of the immunity to error through misidentification of somatosensory judgments and designers of crossed wire cases is whether judgments based on somatosensation involve an identification, or a picking out, of the somatosensorily perceived body as oneself. But these are structural features of the judgment rather than features of scope, structural features that reflect certain architectural facts about the grounds on which they were formed. The only way that a perceptual judgment could be formed in a way that involves an identification of an object as oneself is if the perceptual faculty by which the judgment is formed assumes a separation between the perceiving subject and the subject perceived. Only then could the faculty work by the perceiving sub-



ject identifying, or picking out, the perceived object. Indeed, it's not even clear that we can really make sense of talk of 'identification', or 'picking out', of a perceptual object in the absence of such a separation. If that's right then there is no question of a judgment formed on the basis of a faculty that lacks such a separation involving an identification of the apprehended perceptual object; the faculty's architecture simply does not permit of judgments structured in this way.

All of this is to say that we should *expect* that a difference in the perspectival structure of a perceptual faculty will correspond to a difference in the identification-involvement of a judgment made on its basis, even if a difference in scope will not. So if somatosensation and crossed wire experiences differ with respect to their perspectival structure, then we should expect them to differ too with respect to whether judgments formed on their basis are identification-involving. Now all parties to the present dispute are interested in the question of grounds-individuation in the service of revealing whether the grounds underlying our ordinary somatosensory judgments involve any such identification. (Our somatosensory judgments are identification-involving, so the crossed wire argument goes, because they are made on the same grounds as crossed wire cases, and crossed wire judgments are identification-involving.) So if there are differences in the faculties underlying our somatosensory and our crossed wire judgments that predict differences in the identification-involvement of those judgments, then all parties should agree to treat these as grounds of different kinds, given the question at hand. However the crossed wire proponent individuates her grounds, her reasons for individuating them in the first place requires that her individuating principle be sensitive to these structural differences even if it is not sensitive to differences in scope. The crossed wire designer, then, need not count an artificial extension in range (glasses, telescopes, etc.) as an acceptable reason to plea difference in grounds. But she cannot say the same of an artificially induced structural distortion like the one involved in crossed wire cases.<sup>14</sup>

There is nothing in this argument that depends on the choice of judgment in *Basic Case*. To see this, take again Ann's proprioceptive judgment, *my arm is bent*. Like ordinary somatosensory perceptions of tickles, ordinary proprioceptive perceptions of arm-bends are non-perspectivally structured; there is normally no distance between the point *from* which and *at* which the arm-bend is perceived. Now, even if — *contra* the arguments of §2 — the crossed wire designer found a way to argue that Ann really is perceiving Bob's body, Ann's perception of Bob's bent arm cannot likewise be non-perspectival in structure. That's because by the designer's own lights, it is part of the argued case that Ann is using the crossed wire perception to perceive a body-part distinct from her own body. There could otherwise be no error of misidentification. But in that case there must be some distance between the perceived arm

---

<sup>14</sup>There is also a second reason to treat the grounds underlying ordinary somatosensory judgments and those underlying crossed wire judgments as distinct, but one that risks only speaking to those with a prior taste for disjunctivist accounts of perceptual experience. That is, that given that the non-perspectival structure of crossed wire episodes must be screened off from the experiencing subject, there will be a robust and systematic difference in the veridicality of the kinds of states grounding the two sorts of judgments: one, but not the other, is systematically illusory. This may be enough for some theorists for a rejection of the claim that they are states of the same fundamental kind.

(located in Bob's body) and the position from which the perceiving is done (which must be in Ann's body, if Ann is to be counted as the perceiver.)

This difference, I have argued, is difference enough to block claims to meeting the *sameness of grounds* condition. That's because a difference like this in the architecture of the perceptual faculty underlying a proprioceptive judgment in the ordinary case and Ann's judgment in the crossed wire case gives rise to a predictable difference in whether those judgments will be identification-involving. But the only reason we are engaged in the task of individuating grounds is because we are ultimately interested in the identification-involvement of judgments formed on their basis — it is only because they take the grounds underlying Ann's crossed wire judgment and ordinary proprioceptive judgments to be the same that crossed wire proponents are permitted to extrapolate from the identification-involvement of one of those judgment-kinds to the other. But if this is the reason why the question of grounds-individuation has arisen, then we and the crossed wire designers have a shared reason to treat the difference between a perspectival and a non-perspectival perceptual faculty providing such grounds as a difference that matters. Even by the lights of their own individuating principles the *sameness of grounds* condition cannot be met.

Without meeting the *sameness of grounds* condition, crossed wire cases lose their force. They no longer tell us anything about what our faculty of somatosensation is like. At most, what they tell us is that there is a conceptually possible sensory modality through which we perceive others' bodies 'from the inside'. This modality would be a lot like somatosensory perception in many ways, except that unlike somatosensation, it would be a way of knowing about the instantiation of bodily properties that can be targeted at many objects in the world rather than just one. And corollatively, unlike somatosensation, any first person judgments about those properties formed on that basis would be vulnerable to errors of misidentification relative to their first personal components.

#### 4 Conclusion

The arguments of §2 revealed a gap between the stipulations allowed into *Basic Case* and the *misidentificatory error* condition that cannot be bridged without falling back to brute stipulation. The arguments of §3 showed a similar gap between those stipulations and the *sameness of grounds* condition that should not be bridged even by the crossed wire designers' own lights. But those two conditions must be satisfied if crossed wire cases are to be counterexamples to the claim that somatosensory judgments are immune to error through misidentification relative to uses of the first person concept, and their satisfaction must be shown to follow from legitimate starting assumptions rather than by mere stipulation. So we do not yet have any reason to think that there are any genuine counterexamples to that claim in the form of crossed wire cases.

The descriptive levity with which these cases are usually offered is surely intended by their authors as

nothing more than a harmless argumentative shortcut. If nothing else I hope I have raised some doubts about how harmless this shortcut really is. At the very least, we should await more careful fingerwork in filling in the details of these cases before using them to downgrade our bodily self-knowledge from its status alongside introspection as a way of knowing about ourselves *as ourselves*.

## References

- Armstrong, D.M. (1962). *Bodily Sensations*. Routledge and Paul.
- (1968). *A Materialist Theory of Mind*. New York: Humanities.
- (1984). *Consciousness and Causality*. Ed. by D.M. Armstrong and N. Malcom. Basil Blackwell.
- Aydede, Murat (2009). “Is feeling pain the perception of something?” In: Bermúdez, J.L. (1998). *The Paradox of Self-Consciousness*. MIT Press.
- (2005). “The Phenomenology of Bodily Awareness”. In: *Phenomenology and Philosophy of Mind*. Ed. by David Woodruff Smith and Amie Lynn Thomasson. Clarendon Press.
- Bermúdez, José Luis (2015). “Bodily Ownership, Bodily Awareness and Knowledge Without Observation”. In: *Analysis* 75.1, pp. 37–45.
- Byrne, J.H. and N. Dafny, eds. (1997). *Neuroscience Online: Ann Electronic Textbook for the Neurosciences*. The University of Texas Medical School at Houston (UT Health).
- Cassam, Quassim (1997). *Self and World*. Oxford University Press.
- Chen, Cheryl (2011). “Bodily awareness and immunity to error through misidentification”. In: *European Journal of Philosophy*.
- Coliva, Annalisa (2002). “Thought insertion and immunity to error through misidentification”. In: *Philosophy, Psychiatry, and Psychology* 9.1, pp. 27–34.
- Crane, Tim (2003). “The intentional structure of consciousness”. In: De Vignemont, Frederique (2007). “Habeas Corpus: The sense of ownership of one’s own body”. In: *Mind and Language* 22.4.
- De Vignemont, Frédérique (2011). “A Self for the Body”. In: *Metaphilosophy* 42.3, pp. 230–247.
- (2012). “Bodily Immunity to Error”. In: *Immunity to Error through Misidentification*. Ed. by F. Recanati and S. Prosser. Cambridge University Press.
- (2013). “The Mark of Bodily Ownership”. In: *Analysis* 73.4, pp. 643–651.
- (2015). “Bodily Awareness”. In: *The Stanford Encyclopedia of Philosophy*. Ed. by Edward N. Zalta. Winter 2015.
- Dretske, Fred (1995). *Naturalizing the Mind*. MIT Press.
- (1999). “The Mind’s Awareness of Itself”. In: *Philosophical Studies* XCV, pp. 103–24.
- Evans, Gareth (1982). *The Varieties of Reference*. Ed. by J. McDowell. Oxford University Press.

- Gallagher, Shaun (2003). "Bodily self-awareness and object-perception". In: *Theoria et Historia Scientiarum: International Journal for Interdisciplinary Studies (Poland)* 7.1, pp. 53–68.
- (2005). *How the Body Shapes the Mind*. Oxford: Clarendon Press.
- (2012). "First-Person Perspective and Immunity to Error through Misidentification". In: *Consciousness and Subjectivity*. Ed. by Miguens and Preyer. Ontos Verlag.
- García-Carpintero, Manuel (forthcoming). "De Se Thoughts and Immunity to Error Through Misidentification". In: *Synthese*, pp. 1–23.
- Guillot, Marie (2014). "Identification-Free at Last. Semantic Relativism, Evans, Legacy and a Unified Approach to Immunity to Error Through Misidentification". In: *Teorema: International Journal of Philosophy* 3, pp. 07–30.
- H. Autrum R. Jung, W.R. Loewstein D.M. Mackay H.L. Teuber, ed. (1973). *Handbook of Sensory Physiology: Somatosensory System*. Vol. 3. Springer-Verlag.
- Martin, M. G. F. (1995). "Bodily awareness: a sense of ownership". In: *The Body and the Self*. Ed. by J. et al Bermudez. MIT Press.
- Mizumoto, Masaharu and Masato Ishikawa (2005). "Immunity to Error Through Misidentification and the Bodily Illusion Experiment". In: *Journal of Consciousness Studies* 12.7, pp. 3–19.
- Moller, Aage R. (2003). *Sensory Systems: Anatomy and Physiology*. Elsevier Science.
- Nelson, Randall J., ed. (2000). *The Somatosensory System: deciphering the brain's own body image*. CRC Press.
- O'Brien, Lucy F. (2007). *Self-Knowing Agents*. Oxford University Press.
- O'Shaughnessy, Brian (1980). *The Will: a dual aspect theory*. Cambridge University Press.
- Pitcher, G. (1970). "Pain Perception". In: *Philosophical Review* LXXIX, pp. 368–93.
- Prosser, Simon (2012). "Sources of Immunity to Error through Misidentification". In: *Immunity to Error through Misidentification: New Essays*. Ed. by Simon Prosser and Francois Recanati. Cambridge University Press, pp. 158–179.
- Prosser, Simon and Francois Recanati (2012). *Immunity to Error Through Misidentification: New Essays*. Cambridge University Press.
- Pryor, J. (1999). "Immunity to error through misidentification". In: *Philosophical Topics* 26, pp. 271–304.
- Recanati, François (2007). *Perspectival Thought: A Plea for Relativism*. Oxford University Press.
- Recanati, François (2009). "De re and de se". In: *Dialetica* 63.
- (2012). "Immunity to error through misidentification: what it is and where it comes from". In: *Immunity to Error through Misidentification: New Essays*. Ed. by Simon Prosser and Francois Recanati. Cambridge University Press, pp. 180–201.
- Richardson, Louise (2015). "Perceptual Activity and Bodily Awareness". In: *Proceedings of the Aristotelian Society* 115, pp. 147–165.

- Schmidt, Robert F., ed. (1977). *Fundamentals of Sensory Physiology*. Springer-Verlag.
- Schwenkler, John (2013). "The Objects of Bodily Awareness". In: *Philosophical Studies* 162.2, pp. 465–472.
- Shoemaker, Sydney (1968). "Self-Reference and Self-Awareness". In: *Journal of Philosophy* 65.19, pp. 555–567.
- (1970). "Persons and Their Pasts". In: *American Philosophical Quarterly* 7.4, pp. 269–85.
- Smith, A. D. (2002). *The Problem of Perception*. Oxford University Press.
- Smith, Joel (2006). "Bodily Awareness, Imagination and the Self". In: *European Journal of Philosophy*.
- Soteriou, Matthew (2013). *The Mind's Construction: the ontology of mind and mental action*. Oxford University Press.
- Tye, Michael (1995). *Ten Problems of Consciousness: A Representational Theory of the Phenomenal Mind*. MIT Press.
- (1997). "A representational theory of pains and their phenomenal character". In: *The Nature of Consciousness: Philosophical Debates*. Ed. by Owen Flanagan Ned Block and Guven Guzeldere. MIT Press, pp. 329–39.
- Wittgenstein, Ludwig (1958). *The Blue and Brown Books: Preliminary studies for the 'Philosophical Investigations'*. Blackwell Publishing.
- Wright, Crispin (2012). "Reflections on Francois Recanati's 'Immunity to Error through Misidentification: what it is and where it comes from'". In: *Immunity to Error through Misidentification: New essays*. Ed. by Simon Prosser and Francois Recanati. Cambridge University Press, pp. 247–280.