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Immunity to Error through Misidentification and the Bodily Illusion Experiment*

Abstract: In this paper we introduce a paradigm of experiment which, we believe, is of interest both in psychology and philosophy. There the subject wears an HMD (head-mount display), and a camera is set up at the upper corner of the room, in which the subject is. As a result, the subject observes his own body through the HMD. We will mainly focus on the philosophical relevance of this experiment, especially to the thesis of so-called ‘immunity to error through misidentification relative to the first-person pronoun’. We will argue that one experiment conducted in this setting, which we call the bodily illusion experiment, provides a counterexample to that thesis.

1. Introduction

What we call Mind’s Room Project is a paradigm of experiment in which the subject wears a goggle-style monitor, or HMD (head-mount display), and a camera is set up at the upper corner of a room (which we call Mind’s Room) in which the subject is. The visual information is sent from the camera to the HMD wirelessly.

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The sole author of the paper presented at Sydney was Mizumoto, and practically everything in this paper was also written by Mizumoto, who is therefore responsible for all the mistakes and faults (and poor English!) here. Ishikawa is a ‘producer’ of this experiment, who recognized the value of this idea and made everything (not only financially) necessary for the experiment possible.

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As a result, the subject observes his own body through the HMD, which creates the sense of ‘My body is there (not here)!’ in the subject. (Figure 1)\(^1\)

We have conducted various types of experiments in this setting, including long-term experiments in which subjects spent hours (in the longest case, about 31 hours in three days) in the room. In total 11 people, including one of authors, participated in such experiments. These are still preliminary in character (there are also some ongoing co-projects with social psychologists and cognitive psychologists\(^2\)), but even at this stage, several interesting facts have been observed.

\[\text{Figure 1. Paradigmatic Mind’s Room Situation}\]

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\(^1\) The idea of this experimental setting was first conceived in the context of philosophical thought experiment concerning the traditional problem of the self and body. One may find the similar but more sensory-oriented thought experiment (which seems more concerned with the problem of personal identity) in Dennett (1978). One of the referees of this journal also pointed out the similarity to the interesting NASA robot experiment reported by Cole, Sacks, and Waterman (2000) which they claim demonstrates a counterexample to the immunity thesis (see also Gallagher 2000a for a reply to this). The much more direct ancestor of the idea of this setting, however, is found in Wittgenstein’s RPPI 753, though Mizumoto found this passage after he independently conceived the idea (around 1995). See Mizumoto (2002) for the interpretation and discussion of the passage.

\(^2\) One of which is a version of the experiment relating to the study of active/passive scene recognition (see e.g. Simons & Wang 1998, Yoshino & Kitazaki 2002, Kayahara et al. 2003). Another is a variant of the subject performed task (SPT) (see e.g. Cohen 1989, Engelkamp & Zimmer 1989, 1997). Also, application to the experiments concerning the ‘illusion of transparency’ (phenomena known in social psychology where people overestimate others’ capacity to see through one’s own mind) are now discussed. See Mizumoto & Ishikawa (2005) for some of such results.
In this paper we will focus on experiments whose results seem to be especially philosophically interesting, being relevant to a particular principle discussed in philosophy, namely, the immunity to error through misidentification relative to the first-person pronoun.

2. The Body and the Self in Mind’s Room

In Mind’s Room, the subject sees, through HMD, his own body. The coordination between visually observed bodily movement and proprioceptively known movement, is lost and extremely hard to (re-)establish, and even the subjects who spent three days in this setting did not fully adjust to the space of the room. This is as if there are co-existing two, completely detached bodies, visual body and proprioceptive body. Interestingly, just as the visual body disappears when one closes one’s eyes, the proprioceptive body turns out to be also unstable when subjects first wear the HMDs. They generally claimed that they ‘lost track’ of their own body in some of the tasks (especially those tasks that require visually accurate control of their limbs), and in such occasions regained the body (or the body image) when they closed their eyes.

In another task, where subjects, who stood in the room facing the camera, were asked to draw a large alphabet with one of their hands in the frontal space, most subjects drew the alphabet facing their own bodies, rather than the camera, just as we do when writing alphabets on a blackboard, to the effect that the letter looked reversed from the camera. However, some of the subjects sometimes drew the alphabet facing to the camera, providing the visually obverse letter. This seems to suggest that, in the latter case, the subject is looking at his own body from the camera, in a sense ‘controlling’ the body from there. Here in order to interpret and explain this experiment, therefore, we should introduce another

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[3] For the details of the experiments mentioned in this section, see Mizumoto & Ishikawa (2002).

[4] The reader may now expect the definition of ‘proprioception’ here. However, the precise definition of this notion is already a matter of controversy. It suffices for now to say that proprioception is a process through which we know about the posture and movement of our own body (especially our limbs). Note that this functional definition allows Gibsonian notion of visual proprioception (see Gibson 1979), and therefore, although here we contrast it with visual body, ‘proprioceptive body’ should not be taken as representation of one’s own body solely based on somatic (non-visual) proprioception. See also the later discussion on proprioceptive self.

[5] In one of such tasks, where the subjects lay coasters on the floor to form a letter or figure specified by the experimenter, subjects often got unable to move, or ‘frozen’ for a while, sometimes for more than one minute. They totally went at a loss about what to do or how to move their arms. Note however that this ‘losing track’ is not quite like what happens in moving objects under mirror feedback, as one of the referees suggested. In the latter case the subjects may lose control of their arms, but are still moving them anyway. In the present case, the subjects cannot move, as if they left behind their own body.

[6] In this paper I use ‘body image’ as almost synonymous with proprioceptive body, although the former is mainly used for peripheral parts of the body, the latter for the whole body. Body image is the subjective representation of our own body. It is a descendant of the notion of body schema, introduced by neurologist Henry Head in 1920, to refer to a subconscious postural model of our own body. Although the distinction between body image and body schema is often emphasized (see Gallagher 1995 for details), here ‘proprioceptive body’ is meant to cover both body image and body schema.
The concept, 'I' (or the self). That is, in this explanation, at least sometimes the 'I' of the subject seemed on the side of the camera, rather than on the side of the body. The subjects’ protocols confirm this. For example after the course of experiments one subject reported that he found his sense of the right and left direction clearly transformed towards the end of experiments, from bodily oriented to visually oriented.7

Thus we may say that, in this setting, the self of a subject can split into, on one side, the seeing self (the 'I' on the side of the camera), and on the other side, the seen or observed self (the 'I' visually identified). However, since the latter self is something that is identified through, or one may say even identical with, the visual body, there also should be, reflecting the split of the body (into visual body and proprioceptive body), another self that corresponds to the proprioceptive body: Let us call this the proprioceptive self. This division of self is brought about because the correlation between visual and proprioceptive information, in particular the visual information that tells the position, posture, movement of one’s own body, or what J. J. Gibson called the visual proprioception (Gibson 1979), is totally lost in this setting.8 In normal situation the movement of the body of a person produces the corresponding information about one’s own movement in the environment, which helps the subject to know about the objective conditions of one’s own body. In Mind’s Room, however, no such kind of information is available to the subject. Instead, what he has is what is also available, in principle, to the third person, with the perspective being fixed whichever direction he moves and turns his head. Thus the ecological self, which presupposes (and requires) rich coordination between vision and somatic proprioception, is mostly lost there, and if we can say that the 'I' of the subject in this situation is the seeing self, that seems to imply that the self can be detached from the physical body, making the ‘I’ truly disembodied. However, the self of the subject cannot be confined to the seeing self, especially when the subject moves around in the room. The situation should rather be described as the ordinary self being broken down into several selves. This can be expressed schematically in the following diagram. (Diagram 1)

The issue that will be important in what follows is the connection between the observed self and the proprioceptive self. In order to adjust to the space of Mind’s Room, the proprioceptive self must so to say ‘dwell in’ the visual space (which is literally sharable with others), with one’s body image residing in his

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[7] In one of the tasks we asked the subjects to raise the same hand as the experimenter did. Sometimes the subject and the experimenter both faced the camera, but other times one of them turned their back to the camera. It is in general easier for subjects to turn their back to the camera, for then their visual left-right direction coincides with their bodily left-right direction.

[8] But this does not mean that in this setting the proprioceptive body is purified of any visual element. As noted above, the subjects, when they lost track of their own body, ‘regained’ their (proprioceptive) body by closing their eyes. So we should think that even here the proprioceptive body is ‘contaminated’ by vision as long as the subjects do not close their eyes. (We will later see how susceptible our body image is to visual information.)
Whether that is an accurate description of the state of full adaptation, and whether such a complete adaptation is possible at all, are to be seen in future experiments. (A further interesting question is whether, in the case of full adaptation, even the seeing self is re-united to other selves.) But whatever the answers to these questions might be, one might worry (or expect) that, given the split of the self, something unusual can happen to the self-identity of the subject in such a situation. Indeed, with some further trick, we have succeeded in producing a bodily illusion where the subject ‘felt’ one’s own body in another’s body, which we shall see in the next section.

[9] We have to admit that this kind of highly figurative expression might be hard to understand. The authors can only expect the reader to imagine how it is like to be in this room in order to get the point.
3. The Bodily Illusion Experiment

In what we call the bodily illusion experiment, two subjects, wearing HMDs in the same room and therefore having the same visual image through the camera (thereby sharing the same visual space), are asked to sit on chairs set next to each other, facing the camera, with one of them outside of the visual frame of the camera (hence the frame of HMD), and the other within, so that the subjects can see only one of them sitting on a chair. Then an experimenter simultaneously taps the subjects on the same side of their shoulders, exactly at the same (but irregular) pace. (Figure 2)

In this experiment, the subject whose body was outside of the visual frame of HMD, watching the other subject being tapped on the shoulder, unanimously (all the four subjects who participated in this particular experiment) reported that he ‘felt’ as if the body he was watching was his, although he in fact knew that it was not.10

Figure 2. Tapping Experiment
(Note that although in this figure subjects are standing, the structure of the experiment is essentially the same.)

In fact, the truly important point here is whether such an artificial adaptation, or (re-)unification of the observed self and the proprioceptive self, is possible on the part of the other subject, who really sees his own body through HMD. The bodily illusion experienced by the subject whose body was outside of the frame of camera, suggests that it is possible.

10 In fact, the truly important point here is whether such an artificial adaptation, or (re-)unification of the observed self and the proprioceptive self, is possible on the part of the other subject, who really sees his own body through HMD. The bodily illusion experienced by the subject whose body was outside of the frame of camera, suggests that it is possible.
In order to demonstrate (and thereby to obtain non-verbal evidence) that subjects really (and mistakenly) felt the observed body to be their own, we added an extra element to this experiment, where during the tapping, another experimenter pretended to suddenly hit the subject whose body was within the visual frame of camera, on his head. Our hypothesis was that, if the subject who was supposed to be experiencing the illusion of his body reacted (mistakenly) to the mock-attack, then he would be shown to have really been feeling the body in his visual field to be his own. And we in fact succeeded in videotaping one subject (out of three participants), just after reporting the feeling of bodily-illusion, reacted to avoid the (mock) attack by his hands, whereas it was actually the attack on the other subject.

Note that this experiment was conducted to confirm the prior evidence, i.e., the earlier verbal reports of the subjects, and we do not mean, of course, that if properly conducted, every subject would react in the way this particular subject did in our experiment. What we have shown is the possibility, not the necessity, of the subject’s mistakenly reacting to the attack to the other’s body, which confirms our hypothesis that they felt as if they were there being tapped in the visual frame, while in fact they were not. And that is enough for our discussion that follows.

4. The Immunity Thesis

The result of the last section is particularly interesting in connection with the thesis that one’s report or judgement based on somatic proprioception is ‘immune to error through misidentification’ (hereafter the immunity thesis), which has been held by some philosophers, most notably by G. Evans and J. L. Bermúdez, and at first sight looks fairly plausible. The basic idea of this thesis was originated by Wittgenstein in his (1958). Wittgenstein distinguished two uses of ‘I,’ the use as object (as in the case of ‘I have grown six inches.’) and the use as subject (like ‘I have a toothache.’). Shoemaker (1968), following Wittgenstein, characterized this distinction in terms of the first-person statements that are immune to a certain sort of error and those which are not, and coined the name ‘immunity to error through misidentification relative to the first-person pronoun.’ While in formulating this distinction Shoemaker considered only some special psychological predicates as examples for which the immunity holds, Evans (1982) extended the realm of immunity to cover proprioception.

[11] In the first set of trials, however, subjects got only slightly surprised, and didn’t show any particular reaction. We thought this resulted from the subjects’ inability to react properly to his own danger, lacking the sense of reality in his nearby bodily space. So we devised a task where two subjects play a game with paper bats, trying to hit the other on his head and avoid the attack from the other. Then next we made subjects sit on chairs set side by side facing the camera, so that both subjects could see the whole bodies of their own, where they play the Rock-Paper-Scissors with the experimenter standing behind them, and the one who lost was to be hit on their head by the paper bat, so that they had to avoid the attack with their hands. After these games, which were conducted in informal atmosphere, we went on to other tasks. Then having finished all other tasks, we conducted the tapping experiment at the end.

[12] Even other (two) subjects, who did not respond with explicit avoidance behaviour, still nearly reacted to the attack, and later reported that they had really got surprised.
According to Shoemaker’s formulation, a statement ‘a is $\phi$’ is subject to error through misidentification relative to the term ‘a’, when the following is possible:

the speaker knows some particular thing to be $\phi$, but makes the mistake of asserting ‘a is $\phi$’ because, and only because, he mistakenly thinks that the thing he knows to be $\phi$ is what ‘a’ refers to (Shoemaker p. 557).

No such error seems possible in the case of ‘I am in pain,’ and to say ‘Someone has pain but is it really I who am in pain?’ is generally regarded as meaningless. On the other hand, ‘I have a bump on my forehead’ can standardly be decomposed into ‘Someone has a bump on his forehead’ (what Evans, 1982, calls a predication component) and ‘I am that person’ (an identification component), and is said to be subject to error through misidentification because of the latter component: Where there is identification, there is also a possibility of misidentification. (Thus this distinction can also be made from the respect of whether the relevant content involves an identification component or not.)

What we call the immunity thesis is a specific claim on this immunity in the context of one’s somatic proprioception, made by Evans and more recently by Bermúdez (1998), that the judgment based on it is immune to error through misidentification. Bermúdez used this thesis in order to establish his larger thesis that somatic proprioception is (not only a form of self-perception, but also) a legitimate form of self-consciousness (pp. 147–8). According to him, in order to be qualified as genuine self-conscious thought, the content of somatic proprioception must be about oneself non-accidentally. Bermúdez uses the immunity thesis to satisfy this requirement.

Now as Bermúdez correctly points out (1998, p. 6), Shoemaker’s original formulation of the immunity is too restrictive in the sense that it requires the ground of the relevant first-person content to result in knowledge (‘the speaker knows some particular thing to be $\phi$’). Indeed, for our present purpose it is not even essential for the relevant content to be true. What is crucial for the thesis to be philosophically interesting is whether the judgment that is really based on relevant information channel (in the present case, somatic proprioception) involves self-misidentification. As Bermúdez says, ‘Beliefs and judgments are immune to error through misidentification in virtue of the grounds on which they are based’ (1998, p. 6). The criterion of this ‘based-ness’ or ‘grounded-ness’ may be put counterfactually, as follows: A judgment was based on a particular source or channel of information if and only if, had not the subject had an access to that information channel, he would not have made the judgment (whether it was true or not) in the first place.

Also, while Shoemaker formulated the immunity in terms of statement and first-person pronoun, clearly it is not essential that one has the linguistic capacity to actually use the pronoun in order to misidentify oneself (as Bermúdez appeals to this thesis while assuming that the content of somatic proprioception, the

[13] However, we do not adopt Bermúdez’s specific definition in terms of justification (or warrant). For we do not want to invite unnecessary debates on justification, which, to say the least, is itself one of the most discussed notion in epistemology.
content to be judged, is non-conceptual and hence the judgement can be something merely exhibited in action, not necessarily be expressed in a statement or verbal report). The point of the thesis is, at least in Bermúdez’s version, that one cannot (in nomological sense) misidentify oneself in judgement based on one’s own somatic proprioception.

Now as we use the term, proprioceptive self, something that corresponds to (or simply is) proprioceptive body, can also be put as something that the answer to the question, say ‘Who is being tapped?’ is (in normal situation) based on when the correct answer is ‘I am’ (and similarly for the observed self, ‘Who is that person?’ and the seeing self, ‘Who sees that person?’). Given this use of the term, we can also put the present thesis in a simpler way: We cannot misidentify our own proprioceptive self.

Thus understood, however, it certainly goes against our intuition to deny this thesis. Such misidentification is perfectly possible in the case of the observed self, but how can anyone misidentify one’s own proprioceptive self? We will nevertheless challenge this thesis in what follows, by appealing to the result of the bodily illusion experiment.

5. Bodily Illusion Experiment as a Counterexample to the Immunity Thesis

First consider the following two types of judgment as candidates for possible counterexamples;

(a) I am going to be hit.
(b) I am being tapped.

In normal situation, neither type of judgement would involve relevant misidentification, which can standardly be explained by considering whether the following corresponding two questions make sense or not;

(a’) Someone is going to be hit. But is it really I who am going to be hit?
(b’) Someone is being tapped. But is it really I who am being tapped?

Even though the question (a’) makes perfect sense in some situations, and therefore (a) is subject to error through misidentification, it is, the explanation goes, irrelevant to the thesis, since that judgement is not based on somatic proprioception. On the other hand, (b) is a paradigmatic example which can be used in illustrating the immunity thesis, and presumably it does not make sense to ask the question like (b’).

[14] Note that this thesis should not be understood as logical impossibility of error. The immunity in question rules out only nomological possibility of error. Counterexamples to the immunity thesis have been discussed (e.g. Armstrong 1984, Cassan 1995), like the cases where the subject’s proprioceptive system is somehow ‘hooked up’ to another’s body. But as Bermúdez claims, such cases should be nomologically possible, in order to be counterexamples to the immunity thesis, which is a thesis about ‘contingent facts about the human body’ (Bermúdez, 1998, p. 307, n.12), and is therefore an empirical thesis. On the other hand, we shall argue that, our experiment supplies a strong counterexample in this sense, since our claim here is that we have actually demonstrated it.
In Mind’s Room, in particular in the bodily illusion experiment, however, this standard explanation would not be valid any more. In the case of (a), the judgement ‘I am going to be hit’ by the subject who mistakenly reacted to the mock attack was indeed based on somatic proprioception, in the sense that (since the subject knew that the person in his visual field was not him) he would not have reacted to the attack without the proprioceptive awareness (brought about by the tapping sensation). He made wrong judgement exhibited in his reaction to the attack because he had that somatic illusion (through the tapping), which led him to misidentify the person who was going to be hit as himself. (This is by the way what distinguishes the present case from the cases like merely misidentifying oneself in a mirror, where no somatic illusion is involved.) Thus it demonstrates the case of judgement based on somatic proprioception, which is mistaken because of misidentification, and therefore constitutes a counterexample to the immunity thesis.\(^\text{15}\)

Also consider the case of (b). In this experiment even the judgement ‘I am being tapped’ can involve self-misidentification. This is because, despite its linguistic appearance, the judgement is about the person in the subject’s visual field.\(^\text{16}\) It is by virtue of the coordinated tappings, that the subject feels as if ‘I am that person,’ an identification component that results in the judgment ‘I am being tapped’ in that situation. This is why even an instance of (b) involved misidentification there and the question (b’) would have made perfect sense to the subject at that time. Here one might claim that the subject did not commit any error (through misidentification) in that judgement, because it was true (since the subject himself was in fact being tapped), and therefore it cannot be a legitimate counterexample to the immunity thesis. But whether the judgement is true or not, the case does demonstrate that a judgment based on somatic proprioception can involve an identification component and therefore be subject to error through misidentification, and that is enough for our present purpose.\(^\text{17}\)

Perhaps one might at first find this claim somehow illegitimate, because of the apparent gap between the present example and what he has in mind as a paradigm case of judgment based on somatic proprioception. The present experiment is

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\(^{15}\) One of the referees claimed that the information ‘I am going to be hit’ is clearly given to the subject via vision, and therefore it is the vision that misled the subject rather than the proprioception. But note that, to repeat, the subject knew that the one in his visual field was another person, not him. The proprioceptive information was therefore playing the crucial role there in misleading the subject. The referee instead could have insisted that there the visual information was also playing an essential role (which is in fact what another referee pointed out). But that is no objection to our present claim, unless it follows that the present illusion is a visual illusion. The present illusion is clearly not a visual illusion; the subject’s vision is functioning perfectly all right. (The visual information therefore merely helps (albeit necessary) to produce the illusion there.) It could be an objection only when one assumed that the judgement in question must be based solely on somatic (non-visual) proprioception, which our formulation of the immunity thesis (section 4) does not assume. See the discussion below.

\(^{16}\) The judgement is therefore not purely a tactile one, as one of the referees thought it was.

\(^{17}\) Also note here that, it is not inconsistent to suppose both that a judgement is true, and that it involves misidentification. One can say, for example, ‘Tom wears a red shirt’, looking at John in a red shirt, who he thinks is Tom, while Tom happens to wear a red shirt elsewhere. This utterance or judgement involves misidentification, but is (accidentally) true.
claimed to provide as a counterexample a judgement whose *identification component* is based on somatic proprioception. That is, the experiment confirmed, by the (erroneous) reaction of the subject, the reported bodily illusion ‘I am that person,’ which is no doubt based on somatic proprioception while the predication component (whether ‘Someone is being tapped’ or ‘Someone is being attacked’) is admittedly based on vision. Note, however, that the immunity thesis itself does not specify whether the judgement be based on somatic proprioception by virtue of its predication component or its identification component (or both). All it requires is that the judgement, not its components, be based on somatic proprioception.18

Against this reply, one might still object that even though the judgement in question (whether the instance of (a) or (b)) was based on somatic proprioception in the sense specified earlier, it was also based on visual information. In order for a judgement to be a counterexample to the immunity thesis, he would continue, it must be based *solely* on somatic proprioception, without relying on any visual or any other source of information.19 But that is an independent requirement *in addition to* the present thesis discussed so far, and such a requirement is *ad hoc* if that is added because otherwise the original formulation would allow the possibility of counterexample, and even question-begging if that means that the predication component of the judgement be based on somatic proprioception, since the immunity thesis is thought to be equivalent with the thesis that the judgment based on somatic proprioception cannot be decomposable into predication component and identification component. Also, the demand of such ‘pure’ somatic proprioception is misguided, if that assumes that our experience can anytime be decomposed into different sense modalities. Let us see this last point more closely.

The immunity thesis, at least in Bermúdez’s version, is not a thesis about specific sense modality, let alone a thesis about *sensation*, but one about the *precondition* of self-reference or self-identification.20 Thus what is at issue, say in the case of sensation, is who has the sensation, that is, a sense of self, which is behind the ‘I’ in judgements like ‘I am being tapped now.’21 The present counterexample is therefore meant to be a counterexample due to judgement based on what we have called the proprioceptive self, or the proprioceptive awareness brought about through the tapping sensation, which should carefully be distinguished from a judgement about sensation, like ‘I feel being tapped.’ The latter judgement does seem immune to error through misidentification (see however the later qualification), but even if so, that is irrelevant to the present discussion.

[18] Indeed, to specify that its (say) predication component be based on somatic proprioception would beg the question. See below.
[19] Again, one referee seems to object to the similar effect.
[21] In this sense we do not, pace Bermúdez, count sensation as a kind of proprioception. But Bermúdez might also agree when he said, ‘The paradigm examples of immediate somatic proprioception are kinaesthetic awareness and joint-position sense’(1998, p. 134) Sensations are what we have on top of such kinaesthetic awareness.
The subject’s misidentification in the present thesis must be a matter of his whole (proprioceptive-cum-observed) body (‘That’s my body’), rather than just a part of the body where he has a tactile sensation.22

Thus compare the present experiment with the experiments that demonstrate the various illusions of body image. For example, with some tricks we can sometimes experience the illusion that the tapping or stroking sensations are coming from a dummy hand made of rubber in front of you, or even from a table (or whatever). Or you may experience the illusion that your nose has stretched out long before your face, given the appropriate tapping of the other’s nose with your index finger while being tapped on your nose synchronically by another person.23 These are illusions of body image, showing how plastic it can be. Especially, the first experiment shows that our body image is subject to the influence of visual information, suggesting how much our body image is ‘contaminated’ by visual elements. Then our bodily-illusion experiment can be seen as a variant of this type of experiment, extending the illusion of peripheral part of the body to that of the whole body.

Now the proprioceptive self is, at least in this experiment, a product of cross-modality, and therefore what the judgment is based on cannot be explained by decomposing the ground into purely visual and purely somatic elements (since, even if its predication component is based only on vision, its identification component, ‘I am that person,’ is based neither solely on visual nor only on somatic information); rather, its ground is an amalgam of visual and proprioceptive awareness, or the observed-cum-proprioceptive self.24 That is not an unusual thing, for our empirical world in general is not divided into different modality-specific worlds, but is somehow united to constitute a single reality, which is just what Bermúdez himself emphatically defends when he says, ‘our perceptual awareness of the world is cross-modal,’ or ‘[w]hat we experience in sense perception is a presentation of the world that integrates information from all modalities’(1998, p. 141). But if so, it is quite natural to think that our proprioceptive awareness is also normally cross-modal.

Admittedly, even if our proprioceptive judgement often does not have a modality-specific content, the fact that our proprioceptive awareness is easily susceptible to visual (or other) information does not entail that the somatic proprioception is always contaminated by visual (or other) elements. And it

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[22] And also note that, in order to react to the mock attack, one must have a certain control over his own body, and, as noted in footnote 11, in the first set of trials the subjects barely reacted to the attack. In order to obtain the result we needed to train the subjects to regain the control over their own body in the setting of Mind’s Room. So it is not true that this experiment requires no agency (as another referee suggested). This can be put by using Gallagher (2000)’s distinction of the sense of ownership and the sense of agency as follows; while the tapping sensation brings back the sense of ownership (of his own body) to the subject, he also needed to regain the sense of agency (albeit no movement at the time of the illusion) in order to be able to react to the mock attack.

[23] See e.g. Ramachandran (1998), pp. 59–60. See also the highly interesting episode of ‘amputation of phantom limb’ in chap. 3 of the book.

[24] Though, of course, for the subject who is experiencing the bodily illusion, the observed self is actually not the subject’s own, and therefore the observed-cum-proprioceptive self is merely apparent there. But that is anyway precisely why this is called the bodily illusion experiment.
certainly seems true that we can obtain a kind of pure somatic proprioception whenever we shut down other sources of information (especially vision). Thus the critic may claim that, the present immunity thesis must be a thesis about this kind of purified somatic proprioception.

But note that, this is a stronger version of the thesis, and even aside from the worry of being ad hoc or question-begging mentioned earlier, it is still a meaningful contribution on our part to show that the original (weaker) version of the thesis must be strengthened in order to avoid our type of counterexamples.

However, we may here even suggest that our bodily awareness cannot be purified by merely closing our eyes, by pointing out the possibility that, after a sufficient period in Mind’s Room, the adjusted subject might feel ‘I am there’ even while he closes his eyes. In fact, a subject (Mizumoto), who spent three days in this setting, reports this experience, having one’s ‘visual’ body in his ‘visual space’ even when he closed his eyes. In this connection Hirokazu Yoshimura, a psychologist who has extensively conducted and studied the long-term visual-transposition experiments, reports (1993) that, during the experiment with the left-right reversing goggles on, the subjects ‘see,’ even in the dark or with their eyes closed, some shadowy movements of their own hands where they should be seen if they opened their eyes, as well as a (reversed) visual flow as they turn their heads. According to Yoshimura (1996), at the relatively early stage of the adaptation process the subjects experience the ‘double orientations of body image,’ when they close their eyes. For example, ‘when a right-handed subject moves the right hand with eyes closed, he/she perceives two right hands simultaneously occupying the right- and left-hand positions.’ At the next stage of adaptation, this ‘image’ acquires the proprioceptive property as well, becoming a bimodal object, or ‘the indivisible component of position sense.’ (p. 29) These observations strongly suggest, as he concludes, ‘[…] vision itself will not be altered during perceptual adaptation. Changes occur in the subject’s own body sense.’ (p. 29) Given this, it is therefore no surprise that Yoshimura (1993) claims that the body image has visual property in nature: It is what can be called ‘closed-eye visual image.’

So this kind of observation does seem to suggest that the proprioceptive self is somehow inherently permeated with vision, and cannot be purified by just temporarily closing the eyes: Our proprioceptive awareness is inseparably an

[25] Though, of course when one closes his eyes, he cannot have visual experience and there is no visual field before him. We may therefore call the image ‘closed-eye visual body’, and the corresponding space ‘closed-eye visual space’. Note also that, for the fully adjusted subject, the space would cease to be mere ‘visual’ space. It would become the new, albeit detached from the body, egocentric space. See the following discussion for the spatial consideration.

[26] See Yoshimura (1993). Also, it is well-known that, in such experiments, at the early stage of the adaptation the subjects often make mistakes about the position of their own limbs even when they closed their eyes (Harris, 1980). Moreover, many subjects ‘misperceive’ their own head movements because of the reversed visual information (Yoshimura 1983), but Yoshimura (as a subject) reports that this mistake continued even when he closed his eyes (Yoshimura 1997), because of the (reversed) visual flow mentioned above.

[27] Just before the quoted passage of (1996), Yoshimura also says, ‘[…] the body image does not consist of nonvisual proprioceptive position sense, but it should be overseen by vision […]’ (p. 29).
amalgam of multiple modalities. And if that is true, then there is no such thing as pure somatic proprioception in the sense the critic demands, and therefore the very intelligibility of such an interpretation of the immunity thesis should be questioned.

Finally, it is worthwhile to mention that, considering the fact that the common envisaged counterexamples of one’s proprioceptive system being ‘hooked up’ to another’s body, which are considered as logically possible but not nomologically possible, can be taken as a spatial confusion, where (say) one feels a pain at the place of another’s body, the bodily illusion in our experiment can also be seen as an illusion about where I am; what the subject was then mistaken about was the location of the proprioceptive self in the visual space. If so, this parallel is another piece of evidence that our case should be in principle no different from the imagined paradigmatic counterexamples to the immunity thesis.

Usually, what is called the egocentric space has the proprioceptive self at the center of it, making the judgement ‘I am here’ look a priori truth. But there seems no center of the space in Mind’s Room in the first place. We may think that here the egocentric space has been mapped onto the visual space, which is perspectival but not quite egocentric any more. As we have said, however, that visual space is the place where the subject qua proprioceptive self is to dwell in. Now it is precisely because that place is mistaken by the subject in question, being occupied by the other subject, or because his proprioceptive self is mislocated in the visual space, mistakenly thought to be there in his visual field, that the relevant judgement (whether ‘I am going to be hit’ or ‘I am being tapped’) involves misidentification, taking the other subject’s body as his own proprioceptive-cum-observed self.

Thus although we said that the judgement ‘I feel being tapped’ looks immune to the relevant error, that must be actually taken, in the bodily illusion experiment, as a judgement ‘I feel being tapped there (at that person),’ while the subject in fact knows that he is not that person. This is in effect the paradigm counterexample mentioned above.

[29] This is why the question ‘Where am I?’ becomes a legitimate and interesting question in Mind’s Room. Contrast this situation with the one illustrated in Dennett’s paper with the very title ‘Where am I?’ mentioned in the earlier footnote.
[30] Note here that just as there is nothing inherently visual to the notion of ego-centric space, any location in one’s visual space in this setting is itself nothing inherently visual either, even if it is visually specified.
[31] But if we are right and the immunity thesis is not true, it apparently enforces Bermúdez’s another important thesis, that proprioception (or proprioceptive awareness) is a form of perception. However, we do not quite agree with this thesis either. Bermúdez argues (1998, pp. 135ff) that even though the immunity thesis holds for somatic proprioception, we sometimes ‘lose track’ of our own body. Therefore it meets the constraint (what he calls ‘identification constraint’) that must be met by any form of perception. However, first note that this does not establish that it always involves identification. Even though we do sometimes lose track of our body (which in fact often happens especially in the Mind’s Room situation as we have noted in section 2), we can also lose track of our own thought (saying, e.g. ‘What have I been thinking just now?’). But of course the latter fact does not make our thinking
6. Conclusion

We have seen some results of the Mind’s Room experiments, and argued that one of such results, that of the bodily illusion experiment, constitutes a counterexample to the immunity thesis.32

Now when Shoemaker originally formulated the idea of immunity to error through misidentification, he also distinguished the merely ‘circumstantial immunity’ from the ‘absolute immunity’ (1968, p. 557). He used the statement ‘I am facing a table’ as an example of the former, which if uttered in normal circumstances is indeed immune to error through misidentification (relative to the first-person pronoun), whereas it is not in special circumstances like the person looking into a mirror. If we are correct, then, what we have shown can be put as; the judgment based on somatic proprioception is also only circumstantially, rather than nomologically (let alone logically), immune to error through misidentification.33

We think that the hidden assumption in the immunity thesis was the unity or simplicity of the self. Even if the bodily illusion experiment somehow re-united the proprioceptive self and the observed self, in Mind’s Room the resulting self would still be distanced from the seeing self, which would leave open the possibility of self-misidentification based on proprioception. Thus perhaps one of the

perception. It is rather a form of activities. Secondly, though it is also true that the content of our somatic proprioception has the correctness condition (1998, p. 159), from this it does not follow that proprioception is a form of perception either. Admittedly, when there is a gap between somatic proprioception (or body image) and actual body, it certainly makes sense to say that the somatic proprioception misrepresents our body. But the possibility of misrepresentation is only one of the necessary conditions for anything to be regarded as perception, and is not a sufficient condition. When, for example, we close our eyes and predict the way the surrounding situation is, such prediction can misrepresent the present environment, but we say it is something formed rather than perceived. Similarly, proprioceptive awareness seems more like intention formed by the subject than ordinary perception. The intention of moving our limbs also has correctness conditions or at least conditions of satisfaction, albeit the reversed ‘direction of fit’ (Searle 1983), but it is odd to count it as a form of perception. Now it is no less odd to say we perceive our body than to say we perceive our intention. Like intention where we just have or ‘form’ it, through proprioception we just have or ‘form’ our body image or proprioceptive self (if involuntarily). In fact, the primary concern of Wittgenstein in his similar thought experiment (mentioned in the earlier footnote) was also intention. See Mizumoto (2002).

32 After finishing the first draft of this paper, we came to know about Campbell (1999), who used the phenomena of thought insertion in the schizophrenic patient as a counterexample to the immunity to error through misidentification, and Marcel (2003), who suggested that patients with Anarchic Hand Syndrome could be regarded as providing a counterexample to the Evans’s version of the thesis about the immunity. But see Gallagher (2000a) for the former claim, and Peacocke (2003, pp. 109-110) for the latter. Now whether such cases really constitute a counterexample to the immunity to error through misidentification, our experiment provides a particularly stronger counterexample in the sense that it does not appeal to such pathological (in the sense malfunction is involved and therefore to some extent exceptional) cases. Unlike such cases, anyone can actually experience our setting and know ‘what it is like’ to be in such a situation. We would also like to thank Natika Newton, for kindly introducing her own version (1988) of the criticism of the immunity thesis.

33 But also note that from our discussion it does not follow that the self-judgment based on proprioception always involves identification. The mere possibility of misidentification does not imply the existence of a process or act of identification, any more than the possibility of being abducted to the other planet while sleeping implies our continuous re-affirmation ‘I am now on the earth.’ It is just one of many, innumerable, default assumptions we have in our form of life.
most (at least philosophically) interesting aspects of our Mind’s Room experiments is to show how plastic our self is, by demonstrating the real-time spatial split of it.34

References

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