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Lin, Y.-T., Dranseika, V. (in press). The variety and limits of self-experience and identification in imagination. *Synthese*.

The variety and limits of self-experience and identification in imagination

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Abstract

Imagination and other forms of mental simulation allow us to live beyond the current immediate environment. Imagination that involves an experience of self further enables one to incorporate or utilize the contents of episodic simulation in a way that is of importance to oneself. However, the simulated self can be found in a variety of forms. The present study provides some empirical data to explore the various ways in which the self could be represented in observer-perspective imagination as well as the potential limits on such representations. In observer-perspective imagination, the point of view or perspective is dissociated from the location of one's simulated body. We have found that while there are different ways to identify with oneself in an observer-perspective imagination, the identification is rarely dissociated from first-person perspective in imagination. Such variety and limits pave the way for understanding how we identify with ourselves in imagination. Our results suggest that the first-person perspective is a strong attractor for identification. The empirical studies and analysis in this paper demonstrate how observer-perspective episodic simulation serves as a special case for research on identification in mental simulation, and similar methods can be applied in the studies of memory and future thinking.

Keywords: imagination, self-experience, identification, episodic simulation, observer perspective, memory

1. Introduction

The mental world of human beings is not confined to the here-and-now. We are equipped with the capacity to go beyond perception to represent what is not immediately present in the environment. This ability is the mental activity of episodic simulation, which allows us to "re-experience" the past (episodic memory) and plan for the future (future thinking) (Buckner & Carroll 2007; Schacter & Addis 2007). In particular, imagination allows us to explore alternative realities. As such, we are able to navigate through subjective time and exhibit flexible behaviors (Suddendorf & Corballis 2007).

Self-experience or self-consciousness is crucial in these kinds of episodic simulation, which involve projecting oneself into a simulated world. In such kinds of episodic simulation, the current subject experiences the simulated protagonist as the same person as themselves. These kinds of mental simulation are accompanied by a sense of identity (Klein & Nichols 2012) or "subjective reacquaintance" (Gerrans 2017). That is, when undergoing such imagination, one is not only a person living in the present but also a subject experiencing someone within imagination as oneself. The self-experience in mental simulation allows one to incorporate or utilize the contents of episodic simulation in a way that is of importance to oneself. In imagination, a counterfactual scenario involving oneself can be, for instance, epistemically useful in making personal decisions.[1]

Furthermore, while our phenomenal self—the experience of being a distinct, holistic entity—can appear in different ways with unusual sensory experiences, in altered states of self-experience, such as autoscopic experiences and psychedelic states, so too can our phenomenal self be found in a variety of forms *within* episodic simulation. Observer-perspective episodic simulation (OPES) is the phenomenon in which we can explore such variety. OPES is defined as a representation of a counterfactual scenario relative to the subject's actual situation, with a (visual) perspective that does not originate from one's simulated body (Nigro & Neisser 1983); that is, in OPES, subjects imagine or remember "from the outside" (McCarroll 2018).[2] It can be regarded as a kind of autoscopic phenomenon in episodic simulation. In this paper, we focus on imagination and explore the variety and the limits of self-experience. What are the various forms of self-experience in imagination? Do some of these forms rather than others tend to be present in imagination? We argue that the identification is rarely dissociated from first-person perspective in imagination. In addition, we explore the implications of the variety and limits of self-experience for what gives rise to identification in imagination. We demonstrate how these issues can be explored via observer-perspective imagination (OPI).

In addition, the inquiry into the variety and limits of self-experience allows us to further study the sense of identification in imagination or generally in mental simulation. What gives

[1] However, L.A. Paul (2014) has argued that there is a limit to the epistemic usefulness of imagination, particularly when it involves life-changing decisions, e.g., becoming a parent.

[2] The definition of observer-perspective episodic simulation is debatable. Nigro and Neisser (1983) defined observer-perspective memory in the following way: "[i]n some memories, one has the perspective of an observer, seeing oneself 'from the outside.' In other memories, one sees the scene from one's own perspective; the field of view in such memories corresponds to that of the original situation" (p. 467). In the context of imagination, the field- and observer-perspective phenomena cannot be defined by resorting to the correspondence to the original situation. The definition of observer-perspective imagination in this paper is therefore based on the location of origin of the perspective. In addition, the perspectival difference in *vision* is often adopted in the distinction between field and observer perspectives in the relevant empirical studies.

rise to the experience of being the same person as the protagonist in imagination, memory or future thinking? The issue of identification has been explored via the capacity to imagine being other people (Dilip 2016; Williams 1973; Wollheim 1973), immunity to error through misidentification (Bermudez 2013; Fernández 2014, 2018; Hamilton 2009; Michaelian 2020), as well as identification in episodic simulation with an observer perspective (Lin 2018, 2020; McCarroll 2018). In regard to the last stream of discussion, in contrast to episodic simulation from a field perspective, in which the perspectival property—the origin of the visual perspective—coincides with the embodied property—the location of one's simulated body—these two phenomenal properties of bodily self-consciousness are dissociated in OPES. On the one hand, the phenomenon of OPES shows how one's phenomenal selfhood can be presented in different ways in mental simulation. On the other, investigating how such dissociation affects our sense of identity can inform us about what results in identification in mental simulation (Lin 2018).

In the next section, field and observer perspectives in episodic simulation are introduced. The observer-perspective phenomenon shows how the experience of self can present in different forms and how it raises the issue of identification. We then illustrate how studying identification in OPI allows us to explore what the various forms of experience of self in imagination are and what is unlikely to be imagined (§2). Considering the variety and limits of self-experience has implications for further investigating what gives rise to the sense of identification in imagination—the experience of being the same person as the imagined protagonist (§3). Focusing on imagination, we provide the empirical data on identification in OPI (§4). The data are used to address the issues of variety and limits of self-experience in imagination (§5) as well as their implications for what gives rise to identification (§6). We have found that while there are different ways to identify with oneself in an observer-perspective imagination, the identification is rarely dissociated from first-person perspective in imagination. In addition, such variety and limits pave the way for understanding how we identify with ourselves in imagination. Our results suggest that the first-person perspective is a strong attractor for identification. The empirical studies and analysis in this paper demonstrate how observer-perspective episodic simulation serves as a special case for research on identification in mental simulation, and similar methods can be extended to studies of memory and future thinking.

2. Visual perspectives and the sense of self in episodic simulation: Variety and limits

Most extant studies that seek to understand how the self is represented in episodic simulation have focused on visual perspectives (Nigro & Neisser 1983; Rice 2010; Sutin & Robins 2008). Either a field or an observer perspective can be adopted in imagination, remembering or future thinking. When taking a field perspective, one's origin of visual perspective is located within one's body, similar to the way the subject normally perceives the world and his/her own body. In OPES, a distinct vantage point—often outside one's body—is adopted to view the simulated world and one's own body. Perspectives in episodic simulation have been studied extensively, including their correlations with content (Rice & Rubin 2011), emotional intensity (Berntsen & Rubin 2006), and brain activity (St. Jacques et al. 2017, 2018). However, the question of how perspective shifting affects our experience of identification has been underexplored.

In field-perspective episodic simulation (FPES), the origin of the visual perspective coincides with the location of one's simulated body. One naturally identifies with the simulated

protagonist. Nevertheless, in OPES, the visual perspective is by definition dissociated from where the body is simulated. For instance, when imagining with an observer perspective, one's imagined body is usually visualized or presented in a way that cannot be—or is rarely—perceived.

In such cases, how does one identify with oneself in episodic simulation? There are various ways in which identification can potentially be manifested:

(1) one identifies with the viewpoint in the observer perspective;
(2) one identifies with the simulated/seen protagonist;
(3) one identifies with both the viewpoint and the simulated protagonist; and
(4) one's identification shifts between the viewpoint and the simulated protagonist.[3]

In the context of observer-perspective remembering, these possibilities are supported by philosophers of memory. Fernández (2014, 2018, 2019) seems to speak to the first possibility as his view stresses perspectival features.[4] Meanwhile, McCarroll (2018) argues for the second possibility. According to his view, the observer perspective is an unoccupied point of view—that is, the scene is merely presented from a certain point of view without the experiencer having had the experience of seeing as a character (see also the discussion in §5). The third possibility is supported by Lin (2018, 2020), for it enables the best explanation for the subjects' use of first-person pronouns in their reports and data of observer-perspective imagery in sports psychology. The last one has not been considered in the literature; however, since it has been suggested that there may be two visual perspectives involved in the same episode of mental simulation, shifting between the field and observer perspectives is a reasonable possibility to consider. Note that these philosophers of memory have only argued for the respective views of identification *in memory*, rather than episodic simulation in general. Their views may not apply to imagination, the target phenomenon of this paper.

In this paper, we empirically examine identification in imagination from an observer perspective to explore the variety and limits of self-experience. Before introducing our study (in §4), we will first examine the implications of the variety and limits of the self-experience in mental simulation for the issue of identification.

3. Dimensions of phenomenal selfhood and the phenomenal units of identification in episodic simulation

How one identifies with oneself in OPES indicates what constitutes the experience of identification.[5] To experience being the same person as the protagonist in imagination—or mental simulation in general—requires one to become a self within the mental simulation. In parallel to the discussion of the minimal constitution of phenomenal selfhood in the real world (Blanke & Metzinger 2009; Metzinger 2004), identification can be understood as what gives rise to phenomenal selfhood in the simulated world. In addition, some concepts of phenomenal selfhood are available from the literature on bodily self-consciousness. These will be briefly reviewed before we investigate their implications in studying identification.

[3] There may be other possibilities, but these are the most likely options. This is to some degree supported by our finding that almost no participants chose the option of "other" (see §4).
[4] See Lin (2020) for an analysis of Fernández's view and the ambiguity therein.
[5] The sense of constitution used here is akin to "composition."

For the search for the minimal phenomenal self, Blanke and Metzinger (2009) proposed that three phenomenal properties—first-person perspective (1PP), self-location (SL), and self-identification (SI)—are the necessary and sufficient conditions for one's experience of being a holistic entity. SL, SI and 1PP refer to, respectively, the experiences of being located at or in a spatiotemporal point or space, the sense of identification with the body as a whole, and the geometrical origin of a visuospatial model of reality. These concepts were initially proposed to investigate the dimensions of phenomenal selfhood in autoscopic phenomena such as out-of-body experiences. But as SL, SI and 1PP can also be found in the conscious contents of episodic simulation, they can be regarded as conceptual tools for characterizing various forms of episodic simulation, e.g., mental simulations with a field and an observer perspective.

Furthermore, to account for phenomenal selfhood in dreaming and mind-wandering, Metzinger (2013b, 2017) introduces the concept of "phenomenal units of identification" (UI). UI is "the phenomenal property with which we currently identify, exactly the form of currently active conscious content that generates the subjective experience of 'I am this!'" (Metzinger 2013a, p. 10). For instance, the onset of an episode of mind-wandering is illustrated as an involuntary shift of UI: "The UI shifts to the protagonist of our current mind-wandering episode, say, the model of a future self as employed in periods of autobiographical planning" (p. 10). UI can be used here to capture our study of identification in OPES. What gives rise to the experience of "I am this" in imagination is then to be understood as what phenomenal properties in episodic simulation constitute UI.

When remembering, imagining or future thinking, in addition to one's SL and SI with respect to the physical world and body as well as one's 1PP from which one's visual perception originates, there can be another set of 1PP, SL and SI within the mental simulation. In FPES, the latter set of phenomenal properties coincide. As for OPES, it is defined as a representation of a counterfactual scenario with a perspective that does not originate from one's represented body (cf. Nigro & Neisser 1983). Accordingly, in OPES, one's 1PP is by definition dissociated from one's simulated body. As for SI, if it is present in the mental simulation, it is most likely to be associated with the simulated body. What is less clear is where SL is to be found. Dana and Gozalzadeh's (2017) study in sports psychology shows that training with an observer-perspective imagery is more effective for skill performances that include "spatial positioning of movement" and "visual referencing of its location" (see also Callow & Hardy 2004). The finding suggests that SL in OPES is the same as the location of the simulated body. However, it is noted that where SI and SL are present may not be consistent across different scenarios and that the possibility of the non-presence of SI and/or SL in OPES is not to be excluded. While they can be involved in sport imagery training, they are not necessarily found or found to be present in the same way in every kind and episode of mental simulation.

As this paper aims to investigate how we identify with ourselves in OPES, how does identification in OPES indicate the constitution of UI? As described in §2, there are four possible ways of identification: (1) one identifies with the viewpoint in the observer perspective; (2) one identifies with the simulated/seen protagonist; (3) one identifies with both the viewpoint and the simulated protagonist; or (4) the identification shifts between the two. The first possibility suggests that UI is constituted by 1PP, and the embodied properties, SL and SI—present in OPES or not—are irrelevant to identification. The second possibility indicates that UI is constituted by SI and SL, the embodied properties, not 1PP. The third

shows that the perspectival and embodied properties jointly constitute UI. If the result supports the fourth possibility, it may suggest that there is another element—such as attention—which results in shifting identification. For a more detailed analysis, see §6, in which we discuss the results of our study.

To investigate the variety and limits of self-experience in episodic simulation as well as the constitution of UI, this paper focuses on the experience of self in observer-perspective imagination. The studies and analysis presented here can also be applied to other forms of episodic simulation, such as memory and future thinking (for a more detailed discussion, see §7).

4. The studies on perspectives and identification in imagination

Observer-perspective imagination shows that one's visual perspective can be dissociated from one's imagined body. Our study in this paper further explores whether identification can be dissociated from the origin of 1PP or one's imagined body. We conducted three studies in which participants were asked to perform an imagination task and were then asked about their foci of felt identification.

4.1 Study 1

4.1.1 Participants.

201 participants were recruited on Prolific.ac to take part in this online study (58% identified as females, 39% identified as males, 2% identified as non-binary, and 1% preferred not to indicate their gender). M_{age}=36.1; age SD=13.0; age range 18–75). Here, as in the following study, participants were US or UK nationals who indicated English as their first language.

4.1.2 Materials.

Study participants were asked to perform three tasks: initial imagination task, identification task, and dominant perspectives task.

Initial imagination task.
On Page 1, participants were asked to perform an imagination task, which also served as a training task for the subsequent tasks. Half of the participants were asked to imagine running on a deserted beach, while the other half were asked to imagine singing to a concert hall full of people. This was the instruction:

> After reading this paragraph, you will be asked to close your eyes and spend approximately ten seconds imagining that you are [running on a deserted beach / singing to a concert hall full of people]. Make sure to pay very close attention to what exactly you see in your imagination—you will later be asked some questions about your experience. After finishing the imagination task, you will be asked to proceed to the next page.
>
> Now close your eyes and imagine yourself [running on a deserted beach / singing to a concert hall full of people].

On Page 2, participants were asked whether they succeeded in imagining themselves running on a deserted beach / singing to a concert hall full of people. After answering this question, participants were provided with the following explanation of different perspectives adapted from Radvansky and Svob (2019) and Rice and Rubin (2009):

> Most people imagine events in one of two ways. One way that people imagine an event is through their own eyes, from roughly the same viewpoint that it would be experienced. Another way that people imagine an event is looking at the situation from an external vantage point, where the person imagining can see his or her body in the image.

After reading this explanation, participants were asked to describe what happened during the imagination task:

> When imagining yourself [running on a deserted beach / singing to a concert hall full of people], did you see the scene through your own eyes or from an external vantage point?
>
> [1.] Through my own eyes
> [2.] From an external vantage point[6]
> [3.] The perspective was switching between the two
> [4.] In some other way, explain[7]
>
> How certain are you of your response to the previous question on a (0–100)% scale, with low numbers indicating that you are not sure and high numbers indicating that you are sure?
>
> I am ___ % certain.

Identification task.
On Page 3, participants were asked to perform the imagination task once again, but this time they were explicitly asked to employ the observer perspective:

> Now please do the imagination task again. Please close your eyes and imagine for ten seconds that you are [running on a deserted beach / singing to a concert hall full of people]. This time specifically try to imagine looking at the situation **from an external vantage point**.

Participants were again asked whether they succeeded in imagining the situation from an external vantage point and then were asked to answer an identification question, followed by questions about the certainty and ease of imagining:

> Now, when you think about your experience during the imagining from an external vantage point, which of the following descriptions is the most suitable description of your felt location?

[6] Answer options 1 and 2 were presented in randomized order.

[7] This answer option, as well as option 5 in the Identification question, were followed by text boxes that participants could use to explain their response.

[1.] It feels like I am the one observing the scene from an external vantage point.[8]
[2.] It feels like I am the one inside the scene (i.e., the person [running on a deserted beach / singing to a concert hall full of people]).[9]
[3.] It feels like I am both the one observing the scene and the one inside the scene at the same time.
[4.] It feels like I am switching between being the one observing the scene and the one inside the scene.
[5.] Other: explain.

How certain are you of your response to the previous question on a (0–100)% scale, with low numbers indicating that you are not sure and high numbers indicating that you are sure?

I am ___ % certain.

How easy was it to imagine [running on a deserted beach / singing to a concert hall full of people] from an external vantage point? [On a Likert scale, anchored at 1 – "Very easy" and 7 – "Very difficult."]

Dominant perspective task.
On Page 4, participants were asked to indicate their dominant perspective of imagining, once again followed by a question about certainty, as in the previous two tasks:

When imagining yourself doing something, do you usually see these events through your own eyes or from an external vantage point?

[-2.] Only through my own eyes
[-1.] Mostly through my own eyes
[0.] Equally frequently through my own eyes and from an external vantage point
[1.] Mostly from an external vantage point
[2.] Only from an external vantage point

Finally, on Page 5, participants were asked to indicate their age and gender and then thanked for their participation.

4.1.3 Results.

There were no differences observed between the beach and the concert conditions in the distribution of responses to imagination and identification tasks ($ps \geq .18$) so the two conditions were pooled for subsequent analysis.

Initial imagination task.
For the initial imagination task, five participants (3%) indicated that they did not succeed in imagining the scene, so results are presented for the remaining 196 participants.

[8] Note that the target of our inquiry in this paper is self-experience in imagination including identification in experience. The options are therefore formulated in terms of what it feels like to imagine oneself from the observer perspective.
[9] Answer options 1 and 2 were presented in randomized order.

A majority of the participants (53%; 95% CI = [46%; 60%]) indicated that they imagined the scene from a field perspective, which was more frequent than could be expected by chance alone, i.e., proportion was greater than .25 ($p < .001$). 25% of participants (95% CI = [19%; 31%]) indicated that they imagined the scene from the observer perspective. 21% of participants (95% CI = [16%; 28%]) indicated that the perspective was switching between the two. Frequencies of both of these response options were at chance level (ps > .25). 1% of participants (95% CI = [0%; 4%]) chose "In some other way."[10] See Figure 1(a).

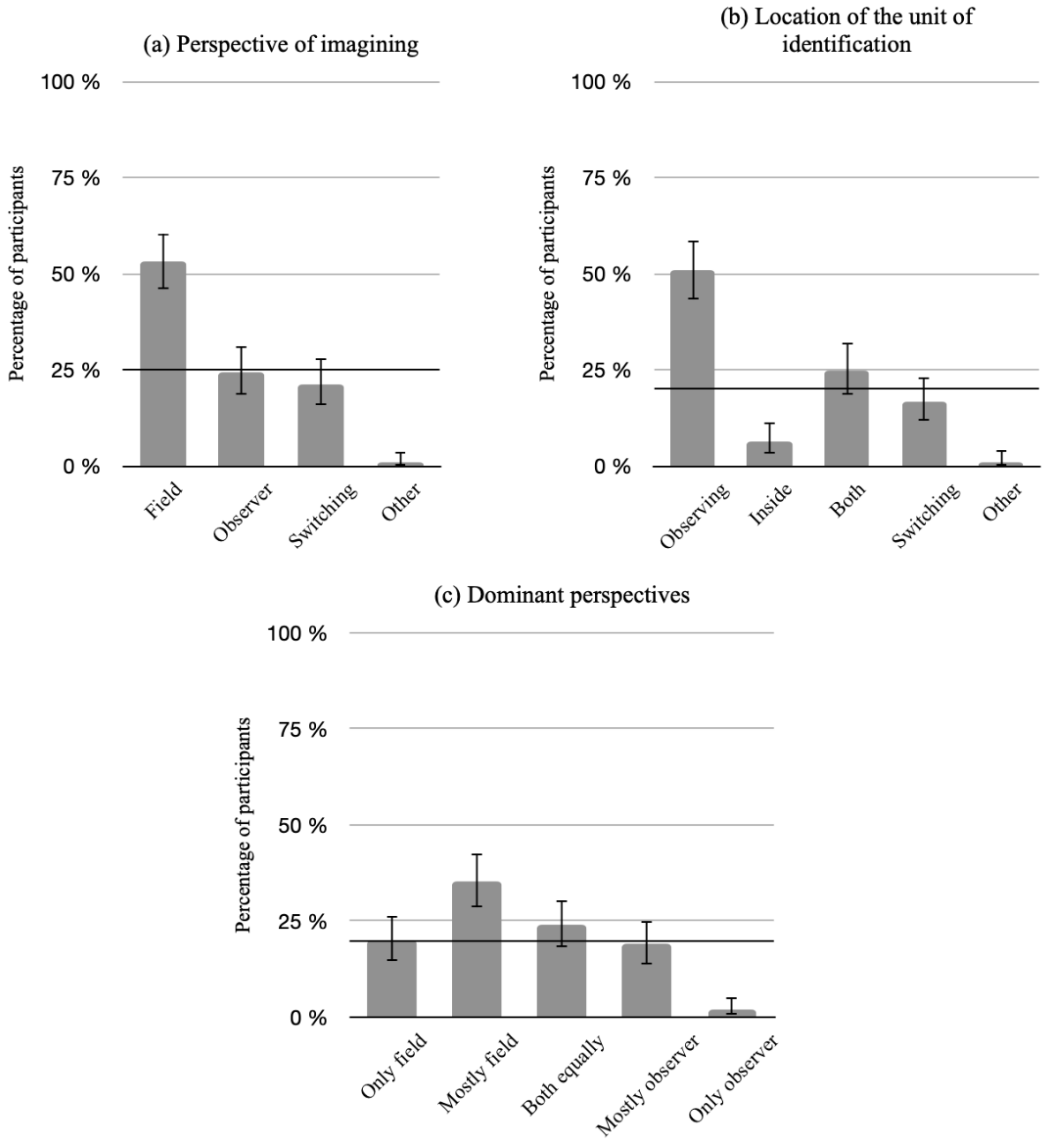

Figure 1. Results of Study 1. (a) Perspective of imagining in the initial imagination task, n = 196, (b) identification in the observer perspective imagination task, n = 173, and (c) the

[10] One of these participants wrote: "Through my eyes, but [I] was aware of myself as like a shadow." Another did not specify their answer.

distribution of responses about dominant perspectives of imagining, n = 201. Reference lines indicate the proportion of responses that could be expected to obtain by chance alone (.25 in (a) and .2 in (b) and (c)). Error bars indicate 95% CI.

Participants felt highly certain about their responses (M = 95%); 71% of the participants indicated that they were 100% certain.[11]

Observer-perspective identification task.
28 participants (14%) indicated that they did not succeed in imagining the scene from the observer perspective, so results are presented for the remaining 173 participants.

From these 173 participants who reported imagining the scene from the observer perspective, a majority (51%; 95% CI = [43%; 59%]) indicated that it felt like they were the one observing the scene from an external vantage point. This response option was provided more frequently than could be expected by chance alone, i.e., more frequently than .20 (p < .001). Very few participants (6%; 95% CI = [3%; 11%]) indicated that it felt like they were the one inside the scene, less frequently than could be expected by chance (p < .001). A quarter of the participants (25%; 95% CI = [19%; 32%]) felt like they were both the one observing the scene and the one inside the scene, while another 17% (95% CI = [12%; 23%]) felt like they were switching between being the one observing the scene and the one inside the scene. Both these answer options were at chance level (ps > .10). 1% of participants (95% CI = [0%; 4%]) chose "In some other way."[12] See Figure 1(b).

Participants felt highly certain about their responses (M = 91%); 56% of the participants indicated that they were 100% certain of their response.[13]

When asked whether it was easy or difficult to imagine the situation from the observer perspective, responses were closer to the "Very easy" than the "Very difficult" end of the scale, M = 3.01, SD = 1.94, $t(172)$ = 6.73, p<.001.[14]

Dominant perspectives. Most participants reported that they imagine only from a field perspective (20%) or mostly from a field perspective (35%). 24% of participants indicated that they imagine equally frequently from both perspectives, and a further 19% indicated that they mostly imagine from the observer perspective. Only 2% of participants indicated that they imagine only from the observer perspective. For the purposes of statistical analysis, the data on dominant perspectives were treated as ordinal data and 0 "equally frequently through my own eyes and from an external vantage point" is treated as the middle-point of this ordinal scale. One-sample Wilcoxon signed rank test showed that participants thought that they more frequently imagine from a field perspective than from an observer perspective, W

[11] Focusing only on those participants who felt highly certain of their response (≥ 90%, n = 171), the same pattern of results can be observed as in the full sample: 55% field, 24% observer, 21% switching, 1% other.
[12] One of these participants wrote: "I was in the scene standing and observing myself run." Another did not specify their answer.
[13] Focusing only on those participants who felt highly certain of their response (≥ 90%, n = 131), the same pattern of results can be observed as in the full sample: 53% observer, 6% observed, 24% both, 15% switching, 2% other.
[14] Focusing only on those participants who found it very easy to imagine the situation from the observer perspective (answering 1 or 2 on the Likert scale, n = 86), the same pattern of results can be observed as in the full sample: 55% observer, 6% observed, 24% both, 14% switching, 1% other.

= 2616, $p < .001$, with both median and modal response being "mostly through my own eyes." See Figure 1(c).

Participants felt quite certain about their responses ($M = 89\%$); 48% of the participants indicated that they were 100% certain of their response. No statistically significant correlation was observed between felt certainty and response to dominant perspectives question ($r_s = -.09$, $p = .23$).[15]

Dominant perspectives and the initial imagination task. Next, we have computed a dummy variable for each of the four response options for the initial imagination task such that the value of the dummy variable is "true" if the participant chose a given response option and "false" otherwise. Then, we have calculated Spearman's rank correlation coefficient between each of these dummy variables and participants' responses to the dominant perspectives question. Participants who indicated that they imagined the scene from a field perspective were less inclined to indicate that they usually imagine from the observer perspective ($r_s = -.69$, $p < .001$). The opposite was the case for participants who indicated that they imagined the scene from the observer perspective. These participants were more inclined to indicate that they usually imagine from the observer perspective ($r_s = .59$, $p < .001$). Interestingly, participants who indicated that their perspective was switching between the two were also slightly more inclined to indicate that they usually imagine from the observer perspective ($r_s = .22$, $p = .002$).[16] There was no relationship between reported felt certainty in the initial imagination task and dominant perspective ($r_s = .06$, $p = .39$).

Dominant perspectives and the observer-perspective identification task. Dummy variables for response options were computed as in the previous analysis. No statistically significant correlations were observed between these dummy variables and participants' responses about their dominant perspective (all ps > .10). Dominant perspective, however, was correlated with whether the participant succeeded in imagining the scene from the observer perspective—those who succeeded in imagining were more likely to dominantly imagine from an observer perspective ($r_s = .28$, $p < .001$). Looking only at those participants who succeeded in imagining from the observer perspective, those who are more likely to imagine from the observer perspective found the task easier ($r_s = -.41$, $p < .001$) and were overall more certain about their responses to the identification question ($r_s = .18$, $p = .019$).

4.2 Study 2

In Study 2, we attempt to replicate the results of Study 1. We also attempt to gain additional insight by asking participants to briefly justify their responses.

4.2.1 Participants.

[15] Focusing only on those participants who felt highly certain of their response (≥ 90%, $n = 132$), the same pattern of results can be observed as in the full sample: 24% only field, 33% mostly field, 26% both equally, 14% mostly observer, 3% only observer. One-sample Wilcoxon signed rank test showed that participants thought that they more frequently imagine from a field perspective than from an observer perspective, $W = 78$, $p < .001$, with both median and modal response being "mostly through my own eyes."

[16] We do not calculate the correlation for the fourth option "In some other way" since only two participants chose this option.

210 participants were recruited on Prolific.ac to take part in this online study (63% identified as females, 36% identified as males, and 1% preferred not to indicate their gender). M_{age}=36.4; age SD=13.1; age range 18–73).

4.2.2 Materials.

In Study 2, materials were the same as in Study 1 with the following four modifications: First, since there were no differences between conditions in Study 1, all participants in Study 2 were asked to imagine running on a deserted beach. Second, instead of asking whether participants succeeded in imagining as separate questions, in Study 2 "I was not able to imagine the scene" was added as an additional answer option to the main imagination and identification questions. Third, participants were asked to explain/justify their responses to imagination and identification questions in two or three sentences. Consequently, participants were no longer asked to separately explain their "Other" and "In some other way" responses. Fourth, while in Study 1 the identification question asked "which of the following descriptions is the most suitable description of your felt location?," in Study 2 "your felt location" was changed to "your experience."

4.2.3 Results.

Initial imagination task. A majority of the participants (53%; 95% CI = [46%; 60%]) indicated that they imagined the scene from a field perspective. This response was more frequent than could be expected by chance alone, i.e., proportion greater than .2 ($p < .001$). 24% of participants (95% CI = [19%; 31%]) indicated that they imagined the scene from an observer perspective. 21% of participants (95% CI = [16%; 27%]) indicated that the perspective was switching between the two. Frequencies of both of these response options were at chance level ($ps > .10$). No participants chose the option "In some other way," and 1% of participants (95% CI = [0%; 4%]) indicated that they were not able to imagine the scene. See Figure 2(a).

Participants felt highly certain about their responses ($M = 96\%$); 67% of the participants indicated that they were 100% certain.[17]

Qualitative examples:

1. – Through my own eyes: "I imagined running on a beach as indicated. What I visualized was not myself from the outside, but the view of the beach I would actually see if I was running on it."
2. – From an external vantage point: "I was watching myself like it was a film scene, running away from the camera."
3. – The perspective was switching between the two: "I initially saw it through my own eyes but as I thought about it more, the perspective switched to an external perspective and then back to first person."
4. – In some other way: none.
5. – I was not able to imagine the scene: "I can't picture things in my imagination."

[17] Focusing only on those participants who felt highly certain of their response (≥ 90%, $n = 189$), the same pattern of results can be observed as in the full sample: 54% field, 25% observer, 20% switching, 0% other, 1% did not succeed in imagining.

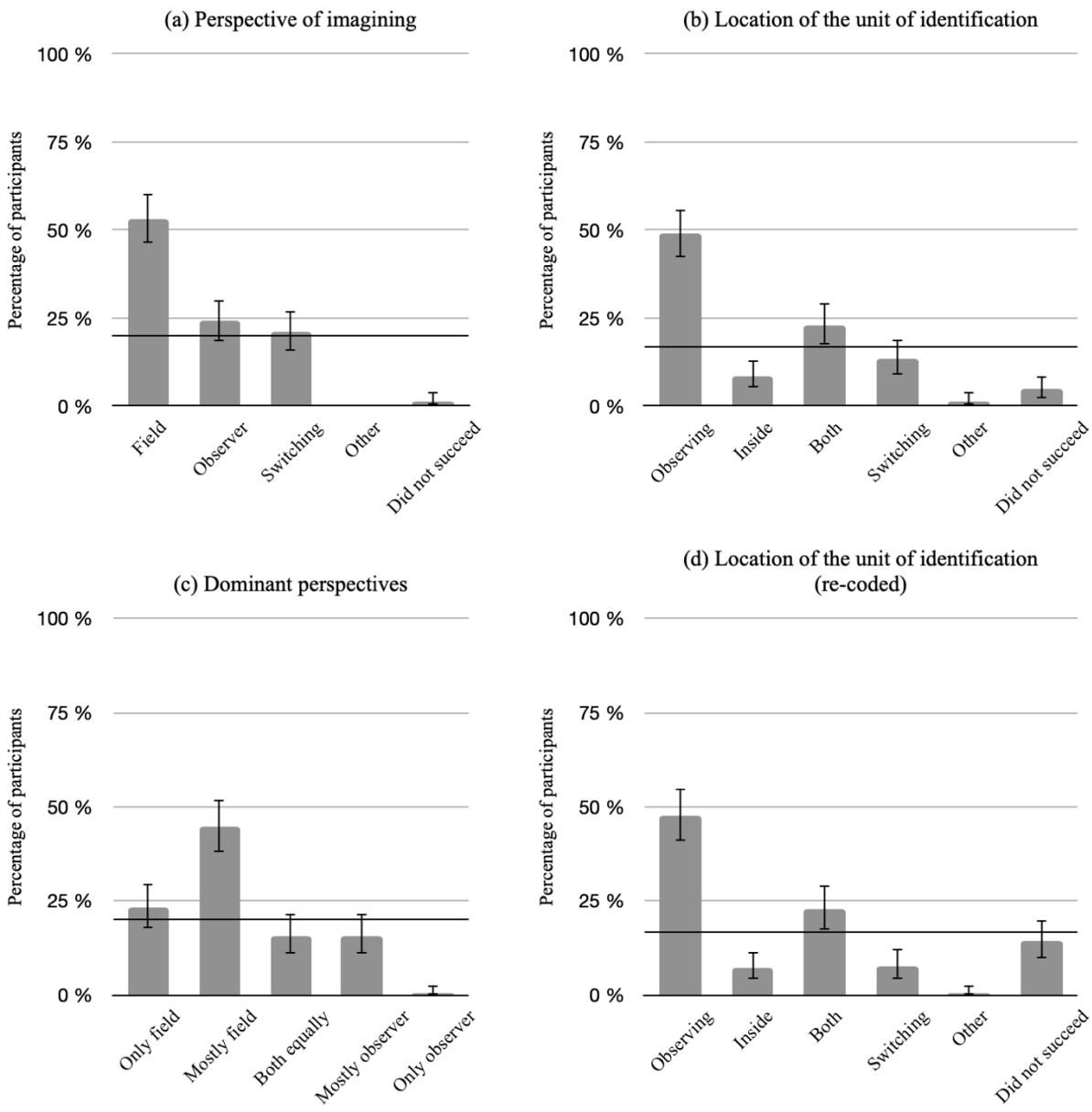

Figure 2. Results of Study 2, $N = 210$. (a) Perspective of imagining in the initial imagination task, (b) identification in the observer perspective imagination task, (c) the distribution of responses about dominant perspectives of imagining, and (d) identification in the observer perspective imagination task after re-coding the data to remove inconsistencies. Reference lines indicate the proportion of responses that could be expected to obtain by chance alone (.2 in (a) and (c), and .167 in (b) and (d)). Error bars indicate 95% CI.

Observer-perspective identification task. Almost half of the participants (49%; 95% CI = [42%; 56%]) indicated that it felt like they were the one observing the scene from an external vantage point, more frequently than could be expected by chance alone, i.e., more frequently than .167 ($p < .001$). Very few (9%; 95% CI = [5%; 13%]) indicated that it felt like they were the one inside the scene, less frequently than could be expected by chance ($p = .001$). Approximately a quarter of the participants (23%; 95% CI = [17%; 29%]) felt like they were both the one observing the scene and the one inside the scene, more than could be expected

by chance alone (p = .020). Another 13% (95% CI = [9%; 19%]) felt like they were switching between being the one observing the scene and the one inside the scene, at chance level (p = .23). 1% (95% CI = [0%; 4%]) chose "In some other way." 4% of the participants (95% CI = [2%; 9%]) indicated that they were unable to imagine the scene from the observer perspective. See Figure 2(b).

Participants felt highly certain about their responses (M = 91%); 49% of the participants indicated that they were 100% certain of their response.[18]

When asked whether it was easy or difficult to imagine the situation from the observer perspective, responses were closer to the "Very easy" than the "Very difficult" end of the scale, M = 3.32, SD = 2.09, $t(209) = 4.71$, $p < .001$.[19]

Qualitative examples:

a) Being the one observing the scene: "From a high vantage point of view, I don't feel a connection with the image of myself running down the beach. Although in this scenario I am imagining my self, it still feels like I am observing a stranger."
b) Being the one inside the scene: "Nobody is on the beach except me, and the sand and the sea. I am in the middle of the scene."
c) Being both: "I felt like I was watching myself, so I was in two places at once. The person running on the beach was me, and the person watching was also me. I felt slightly more connected to the person watching but I did feel like both people were me."
d) Switching between the two: "In trying to observe this from an external vantage point, I had to create a separation between myself as the actor and myself as the observer. It's hard to do both at the same time."
e) Other: "Whilst trying to imagine the scene from an external vantage point, I couldn't avoid focusing more on the space that I was taking up as an observer of the person running—I'd sort of unintentionally created myself as a character, the observer, in the scene."

Dominant perspectives. Most participants reported that they imagine only from a field perspective (23%) or mostly from a field perspective (45%). 16% of participants indicated that they imagine equally frequently from both perspectives and a further 16% indicated that they mostly imagine from the observer perspective. Only 1% of participants indicated that they imagine only from the observer perspective. One-sample Wilcoxon signed rank test showed that participants thought that they more frequently imagine from a field perspective than from an observer perspective, W = 2265, $p < .001$, with both median and modal response being "mostly through my own eyes." See Figure 2(c).

Participants felt quite certain about their responses (M = 87%); 36% of the participants indicated that they were 100% certain of their response. Statistically significant correlation was observed between felt certainty and the response to dominant perspectives question—

[18] Focusing only on those participants who felt highly certain of their response (≥ 90%, n = 162), the same pattern of results can be observed as in the full sample: 55% observer, 7% observed, 22% both, 9% switching, 2% other, 5% did not succeed in imagining the scene.

[19] Focusing only on those participants who found it very easy to imagine the situation from the observer perspective (answering 1 or 2 on the Likert scale, n = 96), a similar pattern of results can be observed as in the full sample, except that this time no participant indicated that they did not succeed in imagining the scene from the observer perspective: 58% observer, 8% observed, 29% both, 3% switching, 1% other.

participants who were more inclined to imagine from the observer perspective were slightly less certain of their response (r_s = -.21, p = .002).[20]

Dominant perspectives and the initial imagination task. Dummy variables were computed as in Study 1. Participants who indicated that they imagined the scene from a field perspective were less inclined to indicate that they usually imagine from the observer perspective (r_s = -.95, p < .001). The opposite was the case for participants who indicated that they imagined the scene from the observer perspective. These participants were more inclined to indicate that they usually imagine from the observer perspective (r_s = .33, p < .001). As in Study 1, participants who indicated that their perspective was switching between the two were much more inclined to indicate that they usually imagine from the observer perspective (r_s = .75, p < .001). Dominant perspective was correlated with whether the participant succeeded in imagining the scene from the observer perspective—those who succeeded in imagining were more likely to dominantly imagine from an observer perspective (r_s = .23, p < .001).[21] Those who were more likely to imagine from the observer perspective were overall slightly more certain about their responses to the perspective question (r_s = .14, p = .049).[22]

Dominant perspectives and the observer-perspective identification task. Dummy variables for response options were computed as in the previous analysis. Two statistically significant correlations were observed between these dummy variables and participants' responses about their dominant perspective (all other four ps > .10). First, dominant perspective was correlated with whether the participant succeeded in imagining the scene from the observer perspective—those who succeeded were more likely to dominantly imagine from an observer perspective (r_s = .21, p = .002). Second, participants who chose the response option "It feels like I am both the one observing the scene and the one inside the scene at the same time." were more inclined to say that they dominantly imagine from the observer perspective (r_s = .19, p = .005). Those who were more likely to imagine from the observer perspective found the task easier (r_s = -.44, p < .001), but there were no differences in reported felt certainty (r_s = .00, p = .96).[23]

Re-coding. Reading through written justifications provided by the participants, we noticed that in some instances written justifications directly contradicted the response provided by participants. In order to address this issue, we re-coded responses to the imagination and identification questions using the following procedure:

Two coders (Coder 1: coder unfamiliar with the aims of the study; Coder 2: one of the two authors) independently went through the responses and noted where, in their opinion, written justification provided by the participant directly contradicted their response, and suggested

[20] Focusing only on those participants who felt highly certain of their response (≥ 90%, n = 132), a similar pattern of results can be observed as in the full sample: 32% only field, 39% mostly field, 16% both equally, 12% mostly observer, 1% only observer. One-sample Wilcoxon signed rank test showed that participants thought that they more frequently imagine from a field perspective than from an observer perspective, W = 11.5, p < .001, with both median and modal response being "mostly through my own eyes."

[21] We do not calculate the correlation for the fourth option "In some other way" since no participants chose this option.

[22] This correlation ceases to be statistically significant once participants who did not succeed in the imagination task are excluded (r_s = .13, p = .074).

[23] These results do not change if participants who report that they did not succeed in imagining the scene from the observer perspective are removed. Those who are more likely to imagine from the observer perspective still find the task easier (r_s = -.40, p < .001) and there are no differences in reported felt certainty (r_s = .05, p = .45).

which response would better express the written justification. For the imagination question, Coder 1 suggested modifying five responses (2.5%), while Coder 2 did not suggest modifying any of the responses. Cohen's κ was run to determine if there was agreement between the two coders. There was near-perfect agreement between the two coders' judgments, $\kappa = .961$ (95% CI, .928 to .994), $p < .001$. After discussion, none of the original responses were modified. For the identification question, Coder 1 suggested modifications for 26 responses (12.4%), while Coder 2 suggested modifications for 27 responses (12.9%). There was substantial agreement between the two coders' judgments, $\kappa = .689$ (95% CI, .615 to .763), $p < .001$. Where both coders agreed on modification, the choice was modified. Where coders had different opinions, remaining differences were resolved via discussion by the two authors. Finally, 30 responses (14.3%) were modified.

Most of the modifications (20 out of 30) were changes from other options to option 6 ("I was not able to imagine the scene."), with the most frequent modification (nine instances) being a change from option 4 ("It feels like I am switching between being the one observing the scene and the one inside the scene."). There were also four changes from "It feels like I am the one observing the scene from an external vantage point." to option 6 and four changes from "It feels like I am the one inside the scene (i.e., the person running on a deserted beach)." to option 6. The remaining 13 changes were of various sorts with no pattern having more than three instances.

Observer-perspective identification task (with re-coded data). Almost half of the participants (48%; 95% CI = [41%; 55%]) indicated that it felt like they were the one observing the scene from an external vantage point, more frequently than could be expected by chance alone, i.e., more frequently than .167 ($p < .001$). Very few (7%; 95% CI = [4%; 12%]) indicated that it felt like they were the one inside the scene, less frequently than could be expected by chance ($p < .001$). Approximately a quarter of the participants (23%; 95% CI = [17%; 29%]) felt like they were both the one observing the scene and the one inside the scene, more than could be expected by chance alone ($p = .020$). Another 8% (95% CI = [4%; 12%] felt like they were switching between being the one observing the scene and the one inside the scene, less than could be expected by chance alone ($p < .001$). 1% (95% CI = [0%; 3%]) chose "In some other way." 14% of the participants (95% CI = [10%; 20%]) were unable to imagine the scene from the observer perspective (at chance level, $p = .405$). See Figure 2(d).[24] [25]

In general, the pattern of results in the re-coded data is very similar to that observed in the original data, with a slightly lower proportion of those whose identification was switching (13% original, 8% re-coded) and a larger proportion of those who failed to perform the task (4% original, 14% re-coded).

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[24] Focusing only on those participants who felt highly certain of their response (≥ 90%, $n = 162$), the same pattern of results can be observed as in the full sample: 54% observer, 6% observed, 23% both, 6% switching, 1% other, 11% did not succeed in imagining the scene. Focusing only on those participants who found it very easy to imagine the situation from the observer perspective (answering 1 or 2 on the Likert scale, $n = 96$), a very similar pattern of results can be observed as in the full sample, except that this time no participant chose "In some other way": 56% observer, 8% observed, 29% both, 2% switching, 4% did not succeed in imagining the scene.

[25] Looking at relationships between dominant perspectives and the observer-perspective identification task, almost identical results are achieved using re-coded data as were achieved with the original data. The only significant correlations remain the same two: those who succeeded in imagining were more likely to dominantly imagine from an observer perspective ($r_s = .23$, $p < .001$) and participants who chose response option "It feels like I am both the one observing the scene and the one inside the scene at the same time." were more inclined to say that they dominantly imagine from the observer perspective ($r_s = .20$, $p = .004$). All other four ps > .40.

4.3 Study 3

In Study 3, we introduce a number of wording changes to instructions in order to check the robustness of the results.

4.3.1 Participants.

100 participants were recruited on Prolific.ac to take part in this online study (71% identified as females, 29% identified as males). M_{age}=34.1; age SD=12.3; age range 19–68).

4.3.2 Materials.

In Study 3, materials were similar to those used in Study 2 with a number of modifications. First, all references to "looking" and "seeing" were removed from the instruction. For instance, part of the instruction "Another way that people imagine an event is looking at the situation from an external vantage point, where the person imagining can see his or her body in the image" now reads "Another way that people imagine an event is as if from an external vantage point, where the imagined scene contains an image of themselves." This was done in order to address a concern raised by one of the reviewers that the notion of looking may bias people to construct the observer as a separate figure. Second, for similar reasons, in the identification task, we no longer use "the one" in response options. For instance, "It feels like I am the one observing the scene from an external vantage point." now reads "It feels like I am observing the scene from an external vantage point." Third, in order to further probe how study participants interpret identification with the observer, we asked those participants who chose this response option to pick which of the following two descriptions captures what they had in mind when choosing this option (with a possibility to choose "Other" if neither of the two descriptions capture what they had in mind):

> [1.] It feels like I am observing the scene from an external vantage point but not part of the imagination (i.e., it feels like I am the person doing the imagining in the real world).
> [2.] It feels like I am observing the scene from an external vantage point but still part of the imagination (i.e., it feels like I am an observer in the imagination).

Fourth, requests to justify their responses in writing as well as the dominant perspectives task were dropped to make the task shorter. Fifth, a number of minor editorial changes were introduced. Study materials used in Study 3 are available in the *Appendix*.

4.3.3 Results.

Initial imagination task. Approximately half of the participants (49%; 95% CI = [39%; 59%]) indicated that they imagined the scene from a field perspective. This response was more frequent than could be expected by chance alone, i.e., proportion greater than .2 ($p < .001$). 28% of participants (95% CI = [20%; 38%]) indicated that they imagined the scene from an observer perspective. 22% of participants (95% CI = [14%; 31%]) indicated that the perspective was switching between the two. Frequencies of both of these response options were at chance level (ps > .05). No participants chose option "In some other way," and 1% of

participants (95% CI = [0%; 5%]) indicated that they were not able to imagine the scene. See Figure 3(a).

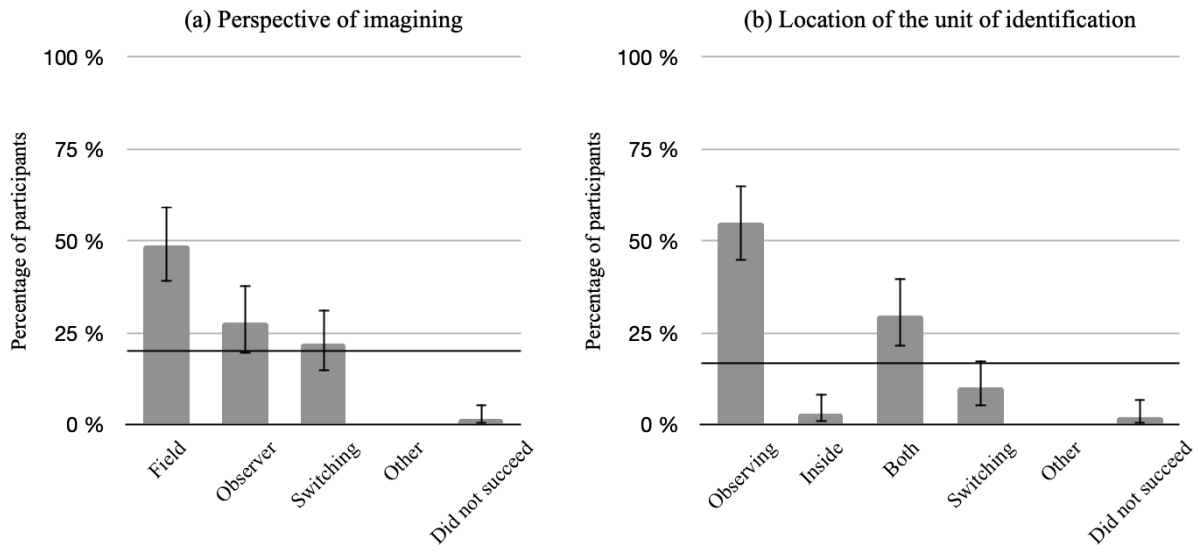

Figure 3. Results of Study 3, $N = 100$. (a) Perspective of imagining in the initial imagination task, (b) identification in the observer-perspective imagination task. Reference lines indicate the proportion of responses that could be expected to obtain by chance alone (.2 in (a) and .167 in (b)). Error bars indicate 95% CI.

Observer-perspective identification task. More than half of the participants (55%; 95% CI = [45%; 65%]) indicated that it felt like they were observing the scene from an external vantage point, more frequently than could be expected by chance alone, i.e., more frequently than .167 ($p < .001$). Very few (3%; 95% CI = [1%; 9%]) indicated that it felt like they were inside the scene, less frequently than could be expected by chance ($p < .001$). Approximately a third of the participants (30%; 95% CI = [21%; 40%]) felt like they were both observing the scene and inside the scene, more than could be expected by chance alone ($p = .001$). Another 10% (95% CI = [5%; 18%] felt like they were switching between observing the scene and being inside the scene, at chance level ($p = .06$). No participant chose "In some other way." 2% of the participants (95% CI = [2%; 7%]) indicated that they were unable to imagine the scene from the observer perspective. See Figure 3(b).

Participants felt highly certain about their responses ($M = 90\%$); 45% of the participants indicated that they were 100% certain of their response.[26]

Answering the follow-up question, the majority of those who earlier identified with the observer indicated that they felt like they were an observer in the imagination (66%; 95% CI = [51%; 78%]). 31% (95% CI = [19%; 45%]) indicated that it felt like they were the person doing the imagining in the real world. The remaining two participants chose "Other."

[26] Focusing only on those participants who felt highly certain of their response (≥ 90%, $n = 70$), a similar pattern of results can be observed as in the full sample: 67% observer, 1% observed, 19% both, 11% switching, 1% did not succeed in imagining the scene.

4.4 Discussion

4.4.1 Perspectives in imagination.

The current studies explored the identification in observer-perspective imagination. The overall dominance of field perspective in imagination (53% in both Study 1[27] and Study 2) is consistent with the findings on perspectives in memory (Nigro & Neisser 1983; Rice & Rubin 2011; Robinson & Swanson 1993)[28] and mind-wandering (Christian et al. 2013). This pattern of results coheres well with participants' responses to the question about their dominant perspective of imagination—in both Studies 1 and 2 a majority of participants reported that they imagine mostly (or only) from a field perspective.

Participants adopting a field perspective (53% in Studies 1 and 2; 49% in Study 3) in the initial imagination task tended to report the imagined environment and experience. For instance, "I was running along the sand, not far from the shoreline, I could see the shoreline as far as the horizon, my legs felt heavy, because the sand was deep." For those who reported adopting an observer perspective (25% in Study 1; 24% in Study 2; 28% in Study 3), their reports often focused on where the viewpoint originates, which can be from behind, in front, from the side, a higher vantage point, a third-floor apartment, many different angles, bird's-eye view, aerial view, etc. Some participants use phrases like "movie," "camera," "TV pictures," "drone" or "film scene" to describe their experience. Approximately one-fifth of the participants (21% in Studies 1 and 2; 22% in Study 3) indicated that their perspective was switching between the two. This possibility is underexplored in other studies on perspective in episodic simulation. From their description, the perspective can switch from observer to field, from field to observer, or alternating between the two.[29]

4.4.2 Identification in observer-perspective imagination.

As mentioned above, there are four possible ways of identification. One can (1) identify with the viewpoint in the observer perspective, (2) identify with the simulated/seen protagonist, (3) identify with both the viewpoint and the simulated protagonist, or (4) have one's identification shift between the viewpoint and the simulated protagonist.

We have found that in observer-perspective imagination, approximately half of the participants (51% in Study 1; 49% in Study 2 and 48% with re-coded data; 55% in Study 3) identify with the one observing the scene (1). This result supports the first possibility of identification—one identifies with the viewpoint in observer-perspective imagination. Descriptions provided by participants often focus on the disconnection from the person running. Here are some examples: "it just feels like I'm watching someone else running on the beach, but I know it's me, but doesn't feel like me or feel connected in any way, just like watching a video"; "[t]he person running didn't really look like me"; "the me running appeared more as an avatar than as my actual self"; "I had to become objective about me as a

[27] Note that percentages for Study 1 refer to the proportion of participants after excluding those who reported that they did not succeed in performing the task (3% were excluded in the observer-perspective imagination task and 14% were excluded in the identification task). Thus, percentages for Study 1 are slightly inflated if compared to Studies 2 and 3, where "I was not able to imagine the scene" was one of the response options.

[28] Note that a higher percentage of observer perspective than field perspective has been reported in memory and future thinking in some studies (McDermott et al. 2016; Rice & Rubin 2011).

[29] The participants were requested to justify their responses in writing only in Study 2.

person rather than incorporating emotion into the experience." Even though they reported the disconnection, they still referred to themselves by using "myself." For instance, one participant reported "I could see myself running, but did not feel connected to the person running, and was more focused on the sights." Two participants reported that their experience was similar to an out-of-body experience. In addition, some elaborated on the location of their perspectival origin; for instance, one participant reported being "on top of a cliff."

As for the fact that only a small number of participants (6% in Study 1; 9% in Study 2 and 7% with re-coded data; 3% in Study 3) identified with the one inside the scene (2), this suggests that identification cannot be easily dissociated from the visuospatial perspective. Most of these participants' descriptions did not focus on the identification, but on their perspective, visual scene, etc. In terms of those who did focus on the identification, they reported "I feel like the person running on the beach was me, they looked familiar." "I could see myself running on the beach. Taken from an aerial view I could tell it was me."

As a quarter of participants (25% in Study 1; 23% in Study 2 both with the original and the re-coded data; 30% in Study 3) chose the option of identifying with both the one observing the scene and the one inside the scene (3), this part of the results also requires an explanation. Some of these participants reported being in two places at the same time: "I was looking from a vantage point, but I was also the person that was running. It was weird, like I was in both places at the same time." In addition to visual description, some participants reported experience from another modality. For instance, "feel the softness of the sand on my feet," "hear the waves crashing beside me," "feel the breeze and exhilaration of running simultaneously." However, while such description also presents in the reports justifying other options, the present study cannot address whether multisensory experiences correlate with any particular form of identification.

Few (17% in Study 1; 13% in Study 2 and 8% with re-coded data; 8% in Study 3) indicated that the object of their identification was switching between the one observing and the one in the scene (4). Note that in Study 2, the number with re-coded data reduced because some of the participants who chose identification switching were actually experiencing perspective switching, judging from their description. Some (14% in Study 1; 4% in Study 2 and 14% with re-coded data; 2% in Study 3) did not succeed in imagining the scene from the observer perspective. Very few (1% in Studies 1 and 2; 0% in Study 3) of the participants reported that their identification presented in some other way. One of them provided an interesting description: Instead of focusing on either the one observing the scene or the one in the scene, she/he focused on "the space that [she/he] was taking up as an observer of the person running."

One limitation of the current study is that we used a very limited set of imagination tasks. In Study 1, we found no significant difference between a social (singing to a concert hall full of people) and a non-social (running on a deserted beach) imagination task, but it would be interesting to explore more scenarios. We currently cannot exclude the possibility that there are other factors that may influence how one identifies with oneself in observer-perspective imagination. While the content of memory can affect the visual perspective adopted (Rice 2010) and the location of the vantage point of the observer perspective (Rice & Rubin 2011), theoretically, these factors may also influence identification.

A potential challenge to our study might be that the result that a large proportion of participants identify with the one observing the scene results from the biased wording in the

instructions and questions.[30] For instance, the participants may confuse the imagining subject with the one observing the scene; that is, while they chose "the one observing," what they were referring to is the real-world imagining subject. This worry is addressed in Study 3 in which we asked the participants to clarify the reasons for their choice. While there were some participants who identified with the observer and then later said that what they meant was the real-life imaginer, more than two-thirds of those who identified with the observer clarified that they identified with the imagined observer—the one observing the scene within the imagination. In addition, if there is a sense of identification in OPES, and the experience of disconnection from the one in the scene is often reported by those who chose the option of identifying with "the one observing the scene," the more reasonable interpretation of such reports is that they do identify with the observer position. Furthermore, the fact that identification cannot be easily dissociated from the first-person perspective is consistent with some views of minimal phenomenal selfhood, which will be discussed in §6.

Furthermore, our studies may also be challenged for focusing on manipulating visual perspectives rather than perspectives of other modalities. First, it is unclear if, conceptually, there are perspectives in all modalities. It may require the experience in a given modality to involve some sort of spatial properties. For instance, while it is conceivable with auditory experience, it is less clear if there can be observer perspectives in taste.[31] Second, in Study 3, we removed the references to "looking" and "seeing" from the instruction, but the results were still in line with those in Studies 1 and 2. However, it is natural that even without instructions on vision, the participants may focus mainly on switching *visual* perspectives. Therefore, field perspectives may still be present in other modalities in imagination when the participants are instructed to adopt an observer perspective. Nevertheless, we predict that manipulating perspectives in additional modalities will result in more identification with the observing perspective than is found in the current study, if it makes any difference there.

5. The variety and limits of self-experience in imagination

There are various forms of self-experience with respect to perspective as well as identification in imagination. Observer-perspective phenomena have shown that one's visual perspective can be dissociated from one's imagined body in imagination—that is, the dissociation of the phenomenal properties of 1PP and self-identification. Our studies on identification further indicate the variety and limits regarding identification in imagination by revealing how identification is associated with or dissociated from the self-related phenomenal properties.

In observer-perspective imagination, at least a third of the participants reported identifying with the one observing the scene.[32] In addition, roughly a quarter of participants identified

[30] We thank reviewers for *Synthese* for pointing this out.

[31] Sutton (2010) has mentioned an "external emotional perspective." However, the definition of observer or external perspective in vision—involving "seeing oneself 'from the outside'" (Nigro & Neisser 1983)—cannot be applied to emotion, and thus the "externality" of an external emotional perspective might carry a different sense in the context of emotion.

[32] Approximately half of the participants reported identifying with the one observing the scene in Studies 1, 2 and 3. In Study 3, after excluding those who chose "It feels like I am observing the scene from an external vantage point" because they indicated that they felt like they were the person doing the imagining in the real world, there were still more than one third of the participants who reported that they felt like they were the observers within the imagination.

with both the one observing the scene and the one in the scene. It seems to show that in an observer-perspective imagination, identification tends to coincide with 1PP and that there is a variation in experience of identification in observer-perspective imagination. Identification can either dissociate from the imagined body or not, but it usually coincides with the visual perspective.

The finding that only a few participants reported identifying with the person inside the scene indicates that identification rarely dissociates from the visual perspective. As noted earlier, there is the possibility that in OPES the subject identifies with the one in the scene rather than the one observing, based on the view that our observer perspective is rarely occupied. Before we discuss how the results of our finding challenge this view, let us briefly look into this view motivated by McCarroll's position on identification in memory.

McCarroll (2018) raises the worry of positing an occupied or explicit observing self in observer-perspective memory (OPM). His concern stems from the potentially problematic consequence of the three-term relation between the real-world subject, the observer, and the observed protagonist, if the observer is regarded as an explicit one (Vendler 1979). For McCarroll (2018), it becomes problematic when "the (subjective) experience of seeing oneself from-the-outside at the time of the original event, from the occupied point of view of an implicit observer, becomes an essential part of the memory" (p. 104) as "memory entails only experiencing what one has done" (p. 105). He, therefore, argues that OPM does not involve such experience, and the point of view is rarely explicit or occupied in OPM. This means that the image—despite the fact that it originates from a spatial point—need not be seen from the point of view of someone. He illustrates the unoccupied point of view via Williams's (1973) analogy of the cinematic point of view. It is interesting that a similar analogy is used in the participants' reports in our second study. While McCarroll (2018) argues that the point of view is mostly implicit or unoccupied in OPM, for OPI, he only suggests that imagination does not *necessarily* involve an occupied point of view (p. 109). However, it is reasonable for someone to maintain that the point of view is rarely occupied in all forms of OPES including memory and imagination—let's call it the "unoccupied view"—even though it is not explicitly supported by McCarroll (2018).

The result that only a small number of participants reported identifying with the person in the scene challenges the unoccupied view, according to which the object of identification in OPES is inside the scene. Furthermore, most participants' reports supporting either the first or the third possibility indicate that the observer perspective is identified with in OPI—even when participants report being the observer as well as the person inside the scene. This seems to show that in OPI, one's point of view is rarely, if ever,[33] unoccupied and is almost always occupied. Despite the variety of self-experience in imagination—particularly OPI—there is a limit to the forms of self-experience in imagination. The results of our studies suggest that identification cannot be easily dissociated from the visuospatial perspective.

[33] Of course, our data cannot prove it is impossible to imagine from an observer perspective without phenomenologically identifying with the geometric origin of a visuospatial model of reality. What our data suggest, instead, is that—given how observer perspective is commonly elicited in the empirical literature (descriptions of field and observer perspectives in our study materials were adapted from Radvansky and Svob (2019) and Rice and Rubin (2009))—participants very rarely report that in successfully completing the task, they did not phenomenologically identify with the geometric origin of a visuospatial model of reality.

6. The constitution of UI in imagination

As introduced in §3, our studies on identification, by indicating the variety and limits of self-experience in observer-perspective imagination, also offer a way to understand the constitution of UI. First, the results that the majority of participants identified with—at least—the observing perspective and that only a small number of participants did not identify with the one observing, support the view that the perspectival aspect or 1PP is an essential part of the constitution of UI in observer-perspective imagination. This finding echoes the development of the view on the minimal phenomenal self. While Blanke and Metzinger (2009) initially proposed that 1PP, SI and SL are jointly the minimal constitution of the phenomenal self, Windt (2010), based on the study of bodiless dreams, has argued that the minimal constitution can be reduced to merely a spatiotemporal 1PP (see also Metzinger 2013b).

Concerning the variation of identification—the result that some participants reported identifying with the observer perspective and some also with the person inside the scene—there are two potential interpretations. One can hold that while visual 1PP is crucial for identification, the embodied aspect (SI and/or SL)—though this can be part of the constitution—is not necessary for UI. By becoming part of the constitution, the embodied aspect can influence how one identifies with oneself in observer-perspective imagination. Because SL in imagination may manifest differently, the variety of identification is observed. SL is not empirically studied in this paper. However, Dana and Gozalzadeh's (2017) study suggests that SL can coincide with the simulated body; on the other hand, some of our reports suggest that SL can be at the observer perspective (e.g., "I was standing on the sand dunes watching me running, but I can't 'feel' myself actually running"). These suggest that SL may differ in each episode of observer-perspective imagination. The correlation between SL and identification can be studied by combining the method adopted in Dana and Gozalzadeh (2017) and our identification task.[34]

An alternative interpretation is that the perspectival and the embodied aspects—that is, 1PP, SI and SL—jointly constitute UI, while there are other factors that influence one's experience of identification or introspection. For instance, how attention is distributed may affect how the experience is reported. These two interpretations cannot be resolved by the current study.

7. Conclusion and directions for future research

Imagination can appear in various forms, as can experiences of self. The present studies focus on self-experience in imagination and provide empirical data to explore the various ways in which the self could be represented in observer-perspective imagination as well as the potential limits to this. Such variety and limits allow us to study how we identify with ourselves in imagination. Our studies and analysis presented here demonstrate how observer-perspective imagination serves as a special case for research on what gives rise to

[34] Note that UI and SL are conceptually distinct: While the former refers to what gives rise to the experience of "I am this," the latter refers to the experiences of being located at or in a spatiotemporal point or space. Therefore, the current study on identification does not inform us about SL. To ascertain whether they are able to be dissociated empirically or whether UI is partially constituted by SL will require further studies.

identification in mental simulation and can be applied to other forms of episodic simulation, such as memory.

To extend the current inquiry, future research should investigate identification in other kinds of OPES. We have focused on perspectives and identification in imagination, while the debate on identification in observer-perspective episodic simulation is in the context of memory (Fernández 2014, 2018, 2019; McCarroll 2018). It is unclear whether the results will be the same for observer-perspective memory (or other forms of episodic simulation). Further empirical data is needed to help resolve the debate.

Acknowledgments. An earlier version of this paper was presented during the virtual seminar hosted by the Centre for Philosophy of Memory, Université Grenoble Alpes. We would like to thank the audience at this event for feedback, especially Christopher McCarroll and John Sutton. We would also like to thank Hsin-Ping Wu for assistance, Simon Mussell for linguistic edits, and Po-Jang (Brown) Hsieh, Shen-yi Liao and three reviewers for their helpful comments. Ying-Tung Lin was supported by a grant from the Taiwan Ministry of Science and Technology (108-2410-H-010-001-MY3).

Appendix

[Page 1; Introduction + initial imagination task]

After reading this paragraph, you will be asked to close your eyes and spend approximately ten seconds imagining that you are running on a deserted beach. Make sure to pay very close attention to what exactly you experience while imagining – you will later be asked some questions about your experience. After finishing the imagination task, you will be asked to proceed to the next page.

Now close your eyes and imagine yourself running on a deserted beach.

If you have completed the imagination task, proceed to the next page.

[Page 2; Questions for the initial imagination task + observer perspective identification task]

Most people imagine events in one of two ways. One way that people imagine an event is as if through their own eyes, from roughly the same viewpoint that it would be experienced. Another way that people imagine an event is as if from an external vantage point, where the imagined scene contains an image of themselves.

Question 1. When imagining yourself running on a deserted beach, did you imagine the scene as if through your own eyes or as if from an external vantage point?

[Answer options 1 and 2 in randomized order]

[1.] As if through my own eyes
[2.] As if from an external vantage point
[3.] The perspective was switching between the two
[4.] In some other way

[5.] I was not able to imagine the scene

Now, you will be once again asked to close your eyes and spend approximately ten seconds imagining that you are running on a deserted beach. Make sure to pay very close attention to what exactly you experience while imagining – you will later be asked some questions about your experience. After finishing the imagination task, you will be asked to proceed to the next page.

Please close your eyes and imagine for ten seconds that you are running on a deserted beach. This time specifically try to imagine the situation as if **from an external vantage point**.

If you have completed the imagination task, proceed to the next page.

[Page 3; Questions for the observer-perspective identification task]

Question 2. Now, when you think about your experience during the imagining from an external vantage point, which of the following descriptions is the most suitable description of your experience?

[Answer options 1 and 2 in randomized order]

[1.] It feels like I am observing the scene from an external vantage point.
[2.] It feels like I am inside the scene (i.e., the person running on a deserted beach).
[3.] It feels like I am both observing the scene and inside the scene at the same time.
[4.] It feels like I am switching between observing the scene and being inside the scene.
[5.] Other.
[6.] I was not able to imagine the scene.

How certain are you of your response to Question 2 on a (0-100)% scale, with low numbers indicating that you are not sure and high numbers indicating that you are sure?

I am ___ % certain.

[Page 4: Follow-up question presented only to those who chose [1.] in Question 2]

Question 3. On the previous page, you chose an option: "It feels like I am observing the scene from an external vantage point." Which of the following two descriptions captures what you had in mind when choosing this option?

[Answer options 1 and 2 in randomized order]

[1.] It feels like I am observing the scene from an external vantage point but not part of the imagination (i.e., it feels like I am the person doing the imagining in the real world).
[2.] It feels like I am observing the scene from an external vantage point but still part of the imagination (i.e., it feels like I am an observer in the imagination).
[3.] Other, explain.

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