

DOSSIER

The sense of agency does not evidence regulative control

A sensação de agência não é evidência de controle regulador

Beatriz Sorrentino Marques¹

ABSTRACT

Libertarians assume that the sense of agency supports their belief in the agent's ability to have done otherwise; however, they do not present arguments in favor of their assumption beyond introspection. Although agents may hold this belief, the mechanisms that give rise to the sense of agency—the comparator model and the perception of the relation between action and events in the environment—do not provide reasons to support it. Nonetheless, these mechanisms can help explain why agents hold the belief in the first place, and the investigation makes clear that the workings of the mechanisms that give rise to the sense of agency are compatible with determinism. Here, I will defend that a compatibilist explanation can be given as to why the sense of agency may seem to support libertarian beliefs. Hence, the sense of agency does not support the libertarian position in the free will debate; it is merely the pre-reflective experience of action as self-caused, and it is associated with control mechanisms.

Keywords: Sense of agency, Regulative control, Incompatibilism, Comparator model, Guidance control.

RESUMO

Libertistas supõem que a sensação de agência apoia a sua crença na habilidade do agente de ter agido de outro modo; contudo, não apresentam argumentos além da introspecção em favor dessa suposição. Embora agentes possam ter essa crença, os mecanismos dos quais emerge a sensação de agência—o modelo comparador e a percepção da relação entre a ação e eventos no ambiente—não dão razões para apoiá-la. Entretanto, esses mecanismos podem ajudar a explicar porque agentes têm essa crença e a investigação do funcionamento desses mecanismos dos quais emerge a sensação de agência deixa clara sua compatibilidade com o determinismo. Defenderei que uma explicação compatibilista pode ser dada para porque a sensação de agência parece apoiar as crenças libertistas. Portanto, a sensação de agência não apoia a posição libertista no debate a respeito do livre arbítrio; pois é meramente a experiência pré-reflexiva da ação como causada por si mesmo e está associada a mecanismos de controle.

Palavras-chave: Sensação de agência, Controle regulador, Incompatibilismo, Modelo comparador, Controle guia.

¹ Universidade Federal de Mato Grosso - UFMT - Programa de Pós-Graduação em Filosofia. Av. Fernando Corrêa da Costa, 2367, Bairro Boa Esperança, 78060-900, Cuiabá, MT, Brasil. Email: bsorren-
tinom@gmail.com.

Introduction

In the debate about free will, libertarians have traditionally assumed that the agent's ability to have done otherwise is evidenced by the phenomenology of agency,² which allegedly supports their incompatibilist position. In the following, I challenge this assumption by elucidating the mechanisms that give rise to the sense of agency, the comparator model—a control mechanism that relies on an efferent copy and sensory feedback—and the perception of the relation between action and events in the environment. Investigating these mechanisms casts doubt on claims that the sense of agency supports belief in the ability to have done otherwise. It seems problematic, for example, that events posterior to the action contribute to the sense of agency, as the mechanisms show is the case. Additional support for questioning the libertarian assumption is found in the hypothesis that the sense of agency is the pre-reflective experience of action as self-caused. Hence, a compatibilist explanation of why the sense of agency may seem to support libertarian beliefs is a promising alternative.

To advance the argument, in section one, I will provide examples of interpretations of the sense of agency that associate it with free will. Libertarians mostly make these claims, but some compatibilists also endorse them. In section two, I briefly consider two x-phi experiments about whether people experience their choices as undetermined by antecedent causes and their conflicting results. It is noteworthy that the experiments are about the experience of choice. When they claim that the phenomenology of agency evidences their view of free will, philosophers sometimes refer to the experience of choice and other times to the sense of agency. However, the two experiences are different; therefore, they must be discussed separately. To deal with the experience of choice, I accept Deery's (2015) compatibilist account of the experience of choice and of why people think of it as incompatible with determinism.

In section three, to deal with claims about the sense of agency, I focus on explaining the mechanisms that give rise to it and how they do not provide evidence for the libertarian view. The experience might feel libertarian, but it is compatible with determinism. There are three main reasons why some people may believe that the sense of agency provides evidence of the alleged support: (1) they interpret the sense of agency in light of previous beliefs, (2) they consider only causes of which they are aware, and (3) it is the experience of oneself as the cause of action. Finally, in section four, I argue that the sense of agency is associated with another kind of control, namely, guidance control.

1. The sense of agency as evidence for the libertarian view

The debate about free will can be summarized by sketching the theoretical positions about whether we have

free will if determinism turns out to be true. Roughly, causal determinism is the thesis that the current events in the world are caused by previous events, and that laws of nature govern these causal relations. Hence, events that happen are determined to happen by the laws of nature and previous events. Free will, on the other hand, is usually taken to mean that agent *S* did *A* at *t* while, *ceteris paribus*, *S* could have done other than *A* at *t*—often called the ability to have done otherwise. The traditional way to divide the theoretical positions is by discriminating them into compatibilist and incompatibilist concerning determinism. Consequently, a lot hangs on how these positions construe determinism and free will.

In general, compatibilists claim that, if determinism is true, freedom is compatible with it. The argument may involve a weaker understanding of freedom that does not include the *ceteris paribus* clause. Contrarywise, incompatibilists claim that freedom is simply incompatible with the truth of determinism. Libertarianism is a noteworthy theoretical view within incompatibilism, which claims not only that free will is incompatible with determinism, but also that we have free will. Some libertarians make explicit the relevance of the phenomenology of agency to their view, claiming that it has an incompatibilist and libertarian content; therefore, it weighs in favor of libertarianism.

It is crucial to understand what the ability to have done otherwise requires. Fischer (1994) reframes the debate as different kinds of control closely related to the free will debate. He connects the libertarian conception of freedom, the ability to have done otherwise, to control. When an agent does *A* while having other possible courses of action open to her, she exerts *regulative control*. She does *A*, but could instead have done otherwise. One reason why Fischer believes that control is at the core of incompatibilists' concerns about determinism threatening free will is the threat of factors external to the agent producing her actions or forcing them in one direction. Much like in scenarios presented by several thought experiments in which skillful neuroscientists, alien brain microchips, or railroad carts in their rails force the agent into acting in a particular way. In these cases, the agent would allegedly lack control over her actions (Fischer, 1994).

Fischer makes a useful distinction between regulative control and guidance control. Regulative control is a kind of control that requires alternative possibilities (Fischer, 1994, p. 131); i.e., for an agent to have this kind of control, everything else remaining the same, the agent must have the ability to have done otherwise than she did at *t*. Fischer does not take a stand on whether we have regulative control when we act. Nevertheless, he believes that we exert another kind of control relevant to freedom when we act, namely, guidance control. Its compatibility with determinism is one of guidance control's main characteristics because it focuses on the *actual sequence* of events that issue the action, not on alternative pos-

² The term "*phenomenology of agency*" is used here as an umbrella term, to encompass all experiences associated with agency, e.g., sense of agency, experience of choice, experience of freedom, etc.

sibilities. Guidance control, according to Fischer, is the kind of control an agent has, for instance, when she is driving her car, decides to turn left and then turns the car left. It does not require that the agent could have alternatively turned right (more will be said about guidance control in section four). It is useful to think about freedom of action in terms of control because it illuminates freedom requirements.

Nida-Rümelin presents the idea that the sense of agency supports the libertarian view in terms of spontaneity, "(...) [t]o be phenomenally aware of doing something involves the experience of oneself as being active. In doing something we experience our own spontaneity" (Nida-Rümelin, 2007, p. 258). By spontaneity, I believe she means a lack of previous elements determining what the agent will do. Searle seems to agree:

[R]eflect very carefully on the character of the experiences you have as you engage in normal, everyday human actions. You will sense the possibility of alternative courses of action built into these experiences [...] that we could be doing something else right here and now, that is, all other conditions remaining the same. This, I submit, is the source of our own unshakeable conviction of our own free will (Searle, 1984, p. 95).

Terry Horgan summarizes the point: "Of particular importance will be the aspect of freedom that is virtually always present in the experience of agency: when I experience some behavior as produced by me, I experience it as something that I could have refrained from doing" (Horgan, forthcoming). Therefore, Horgan agrees that the sense of agency is the experience of having at least the possibility of not having done what one did. Nonetheless, he does not commit to the claim that this is evidence that we have regulative control, for Horgan defends a compatibilist position. These perspectives take for granted that experiencing agency encompasses the experience of regulative control. Moreover, some take it as an endorsement that agents have the said control.

Some libertarians seem to see it in a slightly different way; their claims are about the experience of choosing one's action, which seems to be different from the sense of agency. O'Connor (1995, 2009) thinks that the phenomenology of agency reflects agent causation, understood as the agent's determination of her course of action among several possibilities. Furthermore, he indicates that by the phenomenology of agency, he means the experience of forming an intention or choice. Moreover, Ginet testifies, "My impression at each moment is that I at that moment, and nothing prior to that moment, determine which of several open alternatives is the next sort of bodily exertion I voluntarily make" (1990, p. 90). Campbell (2002) defended that the phenomenology attests to human agents' freedom of choice. The agent chose to do A but could have chosen to do otherwise than she did. The common point in all these claims is that it is considered a brute fact that the phenomenology of agency supports the

libertarian view of free will, therefore dismissing the need for arguments to support such claims. In sections two and three, I investigate whether the claims are well-grounded.

2. Indeterminist intuitions about the experience of choice are compatible with determinism

Before moving forward, it is noteworthy that some philosophers talk about the experience of being active (Nida-Rümelin, 2007), of engaging in standard human action (Searle, 1984), and of experiencing behavior as produced by me (Horgan, forthcoming), which are descriptions that seem about the sense of agency. However, some talk about the power to determine which causal possibility the agent realizes (O'Connor, 2009), and the phenomenology of acts of decision (Campbell, 2002), which seems to refer to the experience of choice.

Although both are part of the phenomenology of agency, they are not the same thing. Imagine I am torn about what to cook for a celebration next week, Italian or Thai food. I will consider what I cook best, what my guest likes best, what ingredients I already have, etc. If I make the decision days in advance, I may have the experience of deciding, but not the sense of agency—though I consider deciding a mental action, it is unclear whether agents have a sense of agency for mental actions. Furthermore, when I am finally making the dish, I may follow the recipe, adding ingredients without deciding to add each ingredient. Perhaps I did not even decide to follow the recipe; on deciding that I would make a specific dish, I simply put the recipe in an easy place to retrieve (usually my phone), because I know that I cannot make it without it. As I am adding the ingredients, I have a sense of agency, even if I do not have an experience of deciding. I believe this is not controversial; I do not think the abovementioned philosophers hold that agents must decide to perform every intentional action. It is a different question whether actions that the agent did not deliberate about and decide to do are free, but this is not relevant to my point. Sense of agency, on the other hand, is associated with overt intentional action (actions that involve bodily movements) in general, independently of whether a decision was part of its production or not. If this is correct, these experiences must be dealt with differently.

The question about why one might believe that the phenomenology of agency supports the libertarian view becomes two questions: (a) why does the experience of choice seem indeterminist? And (b) why does the sense of agency seem like the experience of regulative control? This section focuses on (a).

There is a dispute about whether claims associating the phenomenology of agency to regulative control are consistent with what people claim about their experience when they act. It seems that it is an empirical question. Two studies focused on choosing a course of action and whether people

experienced they had the ability to choose otherwise. Nahmias and colleagues (2004) developed an x-phi experiment to investigate if people (non-philosophers) describe their experience of choice as involving the ability to do otherwise in a strictly libertarian understanding or in a compatibilist understanding of the ability to do otherwise. Roughly, the libertarian understanding requires that when the agent acted, she must have been able to have done otherwise, everything else remaining the same, while the compatibilist claims that she would have done otherwise had she had reasons to do so (i.e., she must have had different reasons to act differently). In the experiment, the subjects answered questions about cases described in a questionnaire. The results point toward a compatibilist *folk intuition*. Conversely, a similar x-phi experiment by Deery, Bedke, and Nichols (2013) showed that people see their experience of choice as the experience of the ability to have chosen otherwise; additionally, they consider their experience incompatible with determinism.

The result of each experiment contradicts the other, so it is hard to know what to make of them. Perhaps one design is more precise than the other one, making its results more reliable. Or perhaps intuitions are unreliable, and it is best to suspend judgment about them, especially when they are contradictory. It might also be the case that the experience in question simply does not have a clear, robust content if it has any. I side with Nichols' (2012) when he states that the phenomenology of agency³ is too thin (anemic, in his terms) to encompass a complex content. Regulative control—the ability to have done otherwise—seems too complex a content for such a thin experience.

Still, I would like to consider Deery, Bedke, and Nichols' (2013) results, which support libertarian claims. Even if the experience of choice encompasses the ability to have chosen otherwise as content, it is an open question whether this means that agents have this ability. Deery (2015) convincingly argues that people may have the experience, but it does not mean that they indeed have such ability.

Deery (2015) defends that the answer to (a)—why does the experience of choosing seem indeterministic—is in how humans experience prospecting. Additionally, he argues that the experience is consistent with determinism. Simplifying Deery's main point, prospecting is mentally simulating possible futures to guide action. It enables agents to select a course of action among the possibilities. It does not need to be a conscious process, though it may be consciously experienced, affectively, or even episodically. For instance, conscious affects have valances that allow agents to compare affective experiences that accompany possible futures in order to choose a course of action. Agents experience choosing possible futures as free because of this comparison between possibilities; prospecting simulates possibilities as open for them, and

they choose, for example, according to the affective valance of these possibilities.

To explain how agents experience choice as indeterministic, Deery proposes a causal model that calculates the outcomes of possible future courses of action. An event (the action) is a variable represented in the model. It can vary in the different ways the event might happen (the agent can perform different actions), depending on the intervention (the agent's decision about what to do). The decision is considered the ideal manipulation in the model, for it manipulates the whole subsequent scenario. The event that happens, how it happens, and the effect it springs, all depend on the decision about which action to perform.

Interventions are *ideal* manipulations because they screen off all other possible causes of change in the effect to test just one variable (one way the action can be). The intervention tweaks how the event will be and how this changes the consequence. Thus, the intervention isolates the causal connection between the event and the consequence. The model treats the agent's decision as the intervention that makes an event happen, the action, and it represents the decision as detached from its antecedent causes, making it possible to focus only on possible effects. Consequently, the decision's antecedent causes are ignored in the model, which is why agents experience their decisions as not being determined. Agents experience their choices as indeterministic because the causal modeling screens off the antecedent causes of her decision. Nonetheless, Deery reminds us that this is consistent with the decision having antecedent causes, and with determinism; therefore, his account of the experience of choice is compatibilist.

3. Sense of agency

Although the x-phi experiments discussed above do not aim at the sense of agency, one may suppose that it is a common-sense belief that the sense of agency supports that human agents have regulative control,⁴ just as some philosophers believe this is the case (see section one). If this is correct, then it is a different matter than the experience of choice, and following Deery's footsteps, it requires an answer to (b) why the sense of agency seems like the experience of regulative control? To answer (b), it will be necessary to offer an account of the sense of agency and elucidate why it does not support belief in regulative control. Additionally, clarification of why it may seem to support this belief will be given. I will offer three possible explanations: previous beliefs influence the interpretation of the sense of agency, lack of awareness of causes, and focus on oneself as the cause of action instead of antecedent causes of action.

³ Nichols alternates between talking about the experience of choice and sense of agency, which are not the same. Hence, I will use *phenomenology of agency* as an umbrella term that encompasses all agential experiences.

⁴ Whether common-sense indeed holds this view is, of course, an empirical question.

3.1. Sense of agency

Although the sense of agency is an elusive experience, Haggard and Clark (2003) conducted a famous experiment that revealed an implicit marker for it, intentional binding,⁵ which co-occurs with the sense of agency. Intentional binding has since been considered an implicit marker of the sense of agency, for the binding suggests that the agent perceives the connection between her action and the expected sensory consequences. The result showed that agents inadvertently make a temporal binding between their intentional action and its results in the world; this is something agents do not do when events are produced by something other than their intentional action. Furthermore, philosophers and cognitive scientists have been interested in the sense of agency and the conceptual elements it encompasses (Marcel, 2003; de Vignemont and Fournier, 2004; Synofzik et al., 2008; Pacherie, 2008; Gallagher, 2012).⁶ Although I do not discuss these elements here, I follow Synofzik et al. (2008) and Gallagher (2012) in making a phenomenological division: pre-reflective and reflective (or non-conceptual and conceptual). The division emphasizes that some of the elements associated with the phenomenology of agency are part of the sense of agency itself—i.e., the experience the agent has when she acts—and some are judgments the agent forms based on the sense of agency and previous beliefs about action, herself, and the world.

The pre-reflective element of the phenomenology of agency is the sense of agency itself.⁷ It depends on a precondition, the mechanisms that register simple covariation between movement and effects in the world through Hebbian learning (Synofzik et al., 2008). Even babies already display the investigative behavior of moving their bodies and observing the results of their movement (Synofzik et al., 2008), such as the movement of an object they hit. The sense of agency is the experience the agent has that she performed the intentional action. It pre-reflectively allows for implicit classification of the action as self-caused.

Before moving on to the reflective elements, it is crucial to the present discussion to explain the mechanisms that engender the sense of agency. A prominent hypothesis is that the sense of agency springs from the comparator model, a control mechanism in the production of action. It is a comparator loop, as Shepherd (2015) calls it (for a review, see Haggard, 2017). The comparator model is composed of an inverse model and a forward model (Haggard, 2017). The inverse model produces a motor command—action selection—given a motor intention, while it also creates a copy of the command, an efference copy. The forward model uses the

efference copy to predict the states the system will be in when carrying out the command, and then it compares sensory feedback signals to these predictions. If these do not match, it produces a *prediction error*,⁸ and the agent does not feel she produced the action; she lacks the sense of agency. The hypothesis is that when prediction and feedback match, the agent has the sense of agency, the experience that she produced the action.

Wen and Haggard (2020) argue, however, that the comparator model does not provide a full account of the sense of agency. Even in situations in which there is a significant prediction error, experiments showed that agents could perceive the results of their actions and have a sense of agency. They suggest that another type of computation contributes to motor performance and the sense of agency: global regularity perception between action and result. The hypothesis is that agents perceive that change and events in the environment depend on their actions, and this allows them to experience the sense of agency and attribute actions and the events that result from their actions to themselves. Awareness of the control one has over the environment helps the agent investigate and take advantage of her environment.

In an experiment in which a disturbance of the comparator model produced a significant prediction error and motor control was weak, but the regularity between action and change in the environment was not disturbed, agents still had the sense of agency (Wen and Haggard, 2020). The same did not occur when the perception of regularity was disturbed. In the latter case, the sense of agency and control detection were diminished. The result suggests that regularity perception helps agents find out which events in the world are under their control. Learning what they can control is relevant because behavior aims to investigate and alter the environment, and it depends on the detection of statistical relations between investigative behavior and events in the environment. If Wen and Haggard are correct, and the perception of regularity contributes to the sense of agency, it allows intentional behavior aimed at an objective. This kind of behavior takes advantage of the environment and reinforces the self-attribution of the action (2020, p. 104074).

Turning to the sense of agency's reflective elements, these encompass inferences and judgments the agent makes about her agency based on the sense of agency and her beliefs and inferences (Synofzik et al., 2008). An example of a judgment may be the agent's explicit attribution of her action to herself based on her beliefs about causation (even if these are not explicit beliefs) and her sense of agency. What has been called the experience of freedom, the experience of control, among others, may indeed be judgments of agency. Consider-

⁵ According to Haggard and Clark (2003), subjects tend to perceive their intentional action and its effect as closer in time than they really are, temporally binding the action and its effects.

⁶ For a dissident view, see Grünbaum (2015).

⁷ Synofzik et al. (2008) call it the feel of agency.

⁸ The prediction error can be used to adjust the movement to reach the expected state.

ing that the sense of agency is a thin experience, it is hard to specify its content. For this reason, it makes sense that some of the content attributed to it might be the contents of judgments made based on the sense of agency, as well as other elements, such as previous beliefs (Synofzik et al., 2008).

3.2. The sense of agency does not evidence regulative control

To investigate whether the sense of agency supports belief in regulative control requires knowing what would have to be the case if the sense of agency did provide support for it. What kind of empirical evidence, if any, could sway us to accept the claim that agents have regulative control over their actions? This issue will hardly be settled on empirical grounds, but empirical evidence might contribute to the discussion. Considering what can be measured in experiments at this time, some possibilities involve evidence about temporal relations, correlation, and subjective reports.

- (1) The sense of agency should be associated with approximately the moment of onset of action. Consider an agent who does A, but could have done otherwise. If the sense of agency is an indicator of this ability, then it should accompany the moment of action initiation, when the agent initiates A, while able to do otherwise.
- (2) It should arise right after a period of indetermination, i.e., a period in which what the agent will do is not defined yet.
- (3) If the ability to have done otherwise turns out to be more modest, perhaps the ability to do A or not do A, something like Libet's (1985) *free won't*,⁹ then the sense of agency should accompany the moment of the alleged possible veto; therefore, before action onset.

The above hypotheses do not exhaust the possibilities. Libertarians can present alternative proposals, but (1), (2) and (3) give an idea of what to expect as evidence in support for the libertarian view of the sense of agency. Moreover, it gives a glimpse of how tricky it can be to find evidence that the sense of agency supports belief in regulative control beyond introspection. Nevertheless, what we know about the sense of agency does not fit with possibilities (1), (2), or (3).

The sense of agency is not associated with the moment of action onset, contrary to hypothesis (1). The comparator model involves a temporally extended process that initiates with action selection and goes on while sensory feedback is still being received. If Wen and Haggard (2020) are correct, hypothesis (2) does not hold either. The sense of agency does

not necessarily arise after a period of indetermination; it arises after the fulfillment of determined expectations. The experiment showed that, independently of the comparator model, the perceived relation between action and its results contributes to the sense of agency, and learning the regularity between action and outcome enables agents to investigate and modify their environments. Hence, agents expect a regularity between actions and outcomes in the environment, and the perception of the expected regularity contributes to the sense of agency, not indetermination.

Finally, it is not relevant for (3) to enter the debate about whether Libet's veto proposal is plausible or possible. For the sake of argument, I will concede that it is. If this is the case, and the sense of agency was the experience of the ability to veto or not veto the production of action, then it should arise before action onset, when the veto is allegedly possible. At most, it should arise until the onset of action because it might be too late to veto the action after that, or at least to veto it entirely. However, the sense of agency does not arise before the onset of action (even accepting some delay in the experience).

3.3. Why the sense of agency may seem to support libertarianism: three possibilities

Considering that the sense of agency is a faint experience and that it is not clear that there is any empirical evidence to support claims about its association with regulative control, one may wonder why philosophers make these claims. There might be more than one explanation, but there are at least three possibilities: (i) agents might interpret their experience in light of their background beliefs or theoretical commitments; (ii) agents might consider only the elements of which they are aware when they think about how they brought about their action; (iii) the focus might be on oneself having caused the action instead of on antecedent causes.

Nichols (2012), Pereboom (2015), and Synofzik et al. (2008) defend a version of (i). As seen above, Nichols defends that the sense of agency is too anemic to encompass a complex representation, such as indeterminism—for the agent to have regulative control, she must not have been determined to act. Synofzik and colleagues (2008) defend that previous beliefs can compose the reflective elements of the phenomenology of agency because the agent's beliefs influence how she interprets her sense of agency. If it is the common-sense view that agents have free will and that free will requires something like regulative control, agents may interpret their sense of agency in light of that belief. They might interpret the anemic sense of agency as indeterministic, if that means it was not determined that one would do A, resulting in the belief

⁹ Roughly, in the famous experiment, Libet found that brain activity associated with the preparation of action, the *readiness potential*, arises approximately 350 ms before subjects become conscious of their intention to act in spontaneous voluntary action. Nevertheless, after becoming conscious of their intention, subjects allegedly could consciously veto the action before its onset.

that the sense of agency supports that agents have regulative control over the action.

Pereboom (2015) argues that the sense of agency itself does not represent any ability, such as the ability to do otherwise. Nevertheless, previous beliefs can influence how one interprets one's sense of agency, for instance, belief in free will. He calls this an *impure phenomenology*. The proposal corroborates Synofzik and colleagues' (2008) view. If this is correct, the phenomenology of agency unduly contributes to the belief that one has regulative control over one's actions if one already believes that agents have regulative control, or at least that they ordinarily seem to have it. Nevertheless, the sense of agency itself does not ground such a claim; one's previous beliefs give rise to it.

Explanation (ii) is also not new; Pereboom reminds us that Spinoza already argued along the lines that when explaining our actions, we take into account only causes we are aware of or know. This means that if our actions are caused by mechanisms we are unaware of, we will not count them in our explanation of action, and we will claim that our actions are uncaused. The conclusion, however, would be mistaken.

In the case of the sense of agency, agents do not usually attend to their previous mental states (beliefs, desires, intentions), although they are able to introspect if they wish. Still, an agent will not be able to establish a regularity between her mental states and her action to claim that there is a causal relation between them. The causal relation between one's mental states (or the neural causes of action) and action is not something agents can experience. Therefore, when one acts, one does not experience the causal antecedents of the action, she only has the sense of agency, which is why the agent does not take notice of the antecedent causes of her action, allowing her to experience agency as indeterministic, in the sense that there is no salient antecedent cause of her action. Nonetheless, the abovementioned scenario is compatible with actions having antecedent causes and even with being determined by them. Therefore, one cannot claim that the sense of agency provides good reasons to believe in regulative control because there is nothing about the sense of agency itself that provides evidence that agents have such control.

If the sense of agency is not the experience of regulative control, then answering what it might be is crucial. The answer will make room for (iii), another compatibilist explanation of why the sense of agency is seen as supportive of belief in regulative control. The sense of agency is a pre-reflective experience of action as self-caused, i.e., caused by oneself, in opposition to an event that happens (de Vignemont and Fournieret, 2004; Synofzik et al., 2008; Haggard, 2017). Synofzik et al. (2008) call the sense of agency a feeling, to emphasize that it is a pre-reflective experience, and they accept that it works as a classification of the action as self-caused, and claim that it springs from a stable encoding of action as self-caused, i.e., caused by oneself. It is the experience of "on line control" (de Vignemont

and Fournieret, 2004, p. 12), meaning that the agent identifies as the cause of the action, in the way it was achieved—as she intended.

A more modest interpretation of what libertarians say about the sense of agency fits this hypothesis. In the claim that actions feel spontaneous (Nida-Rümelin, 2007), perhaps the experience in question can be construed as the experience of the source of action. The sense of agency can be thought of as (or at least encompassing) an experience of source of action (Bayne and Levi, 2006; Horgan, 2003).

Experiencing oneself as the source of the action makes the agent's role in the production of the action salient, and it might lead one to think of oneself as the uncaused causer of the action because *what one does* has a particular experience to it, different from when others act, or from when an event simply happens (Haggard and Clark, 2003). Furthermore, considering that sense of agency classifies actions as self-caused, the agent feels *she* causes things to happen, but there is no such experiential marker for her mental states or neural activity that contribute to the production of the action; she feels she causes the action, but not that she is caused to act. The classification as self-caused goes beyond the agent not being aware of previous causes because the sense of agency *makes salient* the agent's role in causing action. Consequently, she might interpret that no antecedent cause contributed to the production of the action and that she caused the action. Nonetheless, the experience does not necessarily make it true that one is the uncaused causer of the action; for instance, the sense of agency has causes itself, they just are not experienced by the agent.

Although the agent's experience is compatible with belief in regulative control, it cannot work as evidence for it. It may seem like antecedent causes did not determine the action or the sense of agency; however, the experience says nothing about causal antecedents. It just seems this way because it carries no information about how the agent caused it or whether it had an antecedent cause. The sense of agency does not offer information that denies the existence of antecedent causes; it simply does not offer information about antecedent causes at all, while emphasizing the agent's causal role.

4. Sense of agency is associated with guidance control

Now that it is clear that it is mistaken to claim that the sense of agency supports regulative control, if the sense of agency is associated with control, it is more reasonable to associate it with guidance control. Guidance control involves criteria related to the agent's reasons to act (Fischer, 1994, 2012): (1) The agent must be able to recognize reasons to act (especially moral reasons) and act in response to such reasons (2012, p. 11); additionally, (2) the mechanism that issues the action must be the agent's own. I will not focus on requirement (1), but on (2), going from

settling on a course of action to fine motor movement involves processes that guaranty control, and as seen above, the sense of agency springs from these.¹⁰ I will not take up the task of spelling out detailed mechanisms here, but Ellen Fridland (2014) and Joshua Shepherd's (2015) theories about control help us have an idea of what processes might take place in terms of control from when the agent selects a course of action to motor movement.¹¹ The comparator model associated with the sense of agency is part of these control processes; thus, it is a reason to associate the experience with guidance control.

Fridland (2014) suggests that because of practice, agents develop (a) strategic control, (b) selective, top-down, attention control, and (c) motor control.¹² According to this theory, each level of control¹³ cascades into the next, showing how practicing action does not eliminate the need for conscious control, and how the agent's intentions and mental states can influence motor control when performing skilled action.¹⁴

Additionally, Shepherd (2015) points out the importance of implementation and executive aspects of action control. Implementation refers to, literally, the systems' implementation of the steps necessary to achieve a particular goal, i.e., the process of producing states of affairs that satisfy the system's goal. Execution refers to planning, filling in the plan, plan monitoring, and revision of the necessary steps to achieve the particular goal in overt intentional actions. Shepherd also admits that there are higher and lower levels of action control, which is compatible with Fridland's theory. Following what has been said about the sense of agency, Shepherd defends that control mechanisms are comparator loops

that use prediction and feedback (predictive or sensory),¹⁵ which is how executive and implementation aspects articulate and enable action control at each level of control. The comparator model fits the proposal, showing how the sense of agency arises from the control mechanism involved in what can be associated with guidance control.

After the agent has settled on a course of action, the production of the action involves steps that go from the intention to A to moving one's muscles to act in a way that will satisfy the relevant intention. Control mechanisms come into place in different levels of control, and if the action goes as expected (if the feedback signals match the predictions) or the agent perceives the relation between action and intended results, the agent has the experience that it was self-caused, i.e., the sense of agency. If this is correct, the sense of agency may support belief in guidance control. The agent has the sense of agency when she acts as intended through her own mechanisms,¹⁶ which is a relevant part of guidance control.

Conclusion

Libertarians have assumed that the ability to have done otherwise—regulative control—is evidenced in the phenomenology of agency. Considering that they make claims about the experience of choice and the sense of agency, I accept Deery's (2015) defense of a compatibilist explanation of the experience of choice, and I set out to provide a compatibilist account of the sense of agency. For starters, the explanation of the mechanisms that give rise to the sense of agency en-

¹⁰ There is an epistemic side to guidance control that requires that the agent recognize her reasons to act. Additionally, acting in response to reasons means selecting an action course in accordance with those reasons and acting on it. The sense of agency does not seem to be associated to all these requirements, especially the epistemic requirement, but it springs from the mechanisms that issue action—mechanism, according to Fischer (2012), should be understood as process—, specifically from control mechanisms, which show that it can be associated with guidance control.

¹¹ Fischer focuses also on recognizing the reasons to act and selecting a course of action according to such reasons. Here, I am not concerned with these parts of the process, because my focus is on the sense of agency.

¹² Strategic control "ought to be identified with the goals, plans, and strategies that the agent uses in order to guide various instantiations of motor skill" (Fridland, 2014, p. 2744). Though it does not have to be conscious, it is crucially associated with agential control, and it does not automatize. Selective, top-down, attention selects the environment's features relevant to the action the agent intends to perform, including features of the environment to which the agent needs to respond to act. Fridland specifies that this becomes automated in skilled action, but it is still sensitive to the contents of the agent's intentional states, "[...] learning to attend to the right things at the right times" (Fridland, 2014 p. 2746). Motor control "is constituted by the automatized motor routines that are learned through practice and training" (Fridland, 2014, p. 2748); still, it is cognitively penetrable through practice and attention.

¹³ Christensen et al. (2016) agree with Fridland in the separation of levels of control. They propose a very similar distinction between levels. There are also close similarities to Pacherie's (2008) account of control (see Christensen et al., 2016 for a comparison between their proposal and the latter).

¹⁴ Fridland's proposal is concerned with skilled action, but considering that action control comes in degrees, skilled action being at the far end of the spectrum, Fridland's theory can be applied with qualification according to the degree of skill: novice, moderate, confident, and skilled. Roughly, the difference between these levels is how automatized the motor routines are, as well as selective attention, which does not mean that skilled action is fully automatic or even that the motor routines are cognitively impenetrable. If one accepts that control comes in degrees, then it is easy to see that an agent A may have rudimentary selective attention when performing an action, while a skilled agent may have impeccable selective, top-down, automatic attention. This kind of automation may also occur in routine intentional actions that most people would not call skilled.

¹⁵ Shepherd's view is, in this sense, similar to Pacherie's (2008) proposal that control of action depends on a series of comparators.

¹⁶ Of course, there are cases in which this can go array. Wegner (2003) presents cases in which the agent has the sense of agency without having performed the action, or vice-versa. Some of these cases are explained by confounding visual cues, for instance, confirming the relevance of the perception of the relation between action and its consequences.

ables seeing that these mechanisms do not work in a way that supports claims about regulative control. Moreover, at least three compatibilist explanations are possible for why the sense of agency may seem to support the belief in regulative control. Agents interpret their sense of agency in light of previous beliefs, agents do not have the experience of the antecedent causes of their action and remain unaware of these, and agents have the experience of action as self-caused (the sense of agency) but not of being caused to act by antecedent causes. Hence, even if it does not feel that way, the sense of agency is compatible with determinism. Finally, the sense of agency can be associated with the mechanisms that fulfill the requirements for guidance control.

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