Penultimate Version of a Paper Published in *Topoi. An International Review of Philosophy.* First Online: 23 January 2017. DOI: 10.1007/s11245-017-9451-2

Please quote from published version.

Putting Plural Self-Awareness Into Practice: The Phenomenology of Expert Musicianship.

Alessandro Salice
Department of Philosophy, University College Cork
alessandro.salice@ucc.ie

Simon Høffding
Department of Psychology, University of Copenhagen
simon.hoeffding@gmail.com

Shaun Gallagher
Department of Philosophy, University of Memphis
Philosophy Faculty of Law, Humanities and the Arts, University of Wollongong
s.gallagher@memphis.edu

Abstract

Based on a qualitative study about expert musicianship, this paper distinguishes three ways of interacting by putting them in relation to the sense of agency. Following Pacherie (2014), it highlights that the phenomenology of shared agency undergoes a drastic transformation when musicians establish a sense of we-agency. In particular, the musicians conceive of the performance as one single action towards which they experience an epistemic privileged access.

The implications of these results for a theory of collective intentionality are discussed by addressing two general questions: When several individuals share an intention, does this fact secure *plural self-*knowledge? And is it possible to have non-observational knowledge about a collective action? It is claimed that the results drawn from the study about expert musicianship supports negative answers to both questions.

Keywords: Joint Action; Practical Knowledge; Shared Intention; Pre-reflective Self-Awareness; Expert Musicianship

1. Self-Knowledge and Practical Knowledge.

There is widespread agreement within debate on collective intentionality about the idea that agency not only comes in individual, but also in collective forms. It is generally assumed that the notion of collective intention is the horse pulling the cart in the explanation of collective agency: for an action to be a collective action, it has to be performed upon a collective intention. This paper operates under the same assumption and aims at answering two different and yet interconnected questions: Are collective intentions grounded in *plural self*-knowledge? And is it possible to have non-observational knowledge about a collective action? The article argues in favor of negative answers to both questions.

However, before rushing to the arguments in support of the suggested answers, one is perhaps well advised to first have a look at individual agency. In the literature, some have claimed that, if an agent intends to φ, she has "pre-reflective self-awareness" (henceforth: PSA).[1] Hans Bernhard Schmid (2014, 2016, MS) describes the PSA that accompanies intentions as a form of personal knowledge characterized by four general features: self-identification, self-commitment, self-authorization and self-validation. Let us have a brief look at these features.

To know that "I intend to φ" is self-identifying, for Schmid, because it "infallibly" establishes the identity of the intender: if you know you intend to φ, you know it is *you* who intends to φ.[2] To put this differently, PSA is a feature of intentions by which the intention immediately presents itself to the subject as his or her intention, i.e., as an intention had by him or her. Also, knowledge of the form "I intend" leaves no motivational gap and hence it self-commits. In Schmid's words: it blocks challenges of the form "I intend – but why should I care?" In addition, this form of knowledge warrants self-authorization: knowledge of the form "I intend" puts the intender in the privileged position of the one who knows best about what he intends – given that the intender is the one who has made up his own mind. Such privilege is rooted in the epistemology of this form of knowledge, this being self-validating: knowledge of the form "I intend" is immune against challenge concerning its source. If you intend to φ, you know it immediately and non-inferentially because, Schmid maintains, it is in virtue of the very form of knowledge itself that you know.

This form of self-knowledge displayed by the subject having an attitude (an intention) impacts the knowledge the subject has about the *action* she may perform upon that attitude. In fact, one way to reformulate the above is that the agent does not need to observe random intentions to know which intentions are her intentions: having an intention always is having an intention of which the agent knows immediately that it is her intention – and this is because having an intention is accompanied

[1] The concept and label of "pre-reflective self-awareness" are of phenomenological provenance (cf. Zahavi 1999, 2005), but in this paper we are forced to leave significance and implications of the phenomenological concept for the topic at issue out of consideration.

[2] Some authors contend that an agent can have unconscious intentions as well as perhaps false beliefs about having (and maybe even acting upon) certain intentions (cf. Pacherie 2001 and Bratman 2009), but we can bracket these complications for the purposes of this article.

by PSA. Hence, if the action of φ-ing is the agent's intentional action in the sense that it is an action she is performing upon her intention to φ, then she does not need to observe her bodily movements or her activities to know (to have practical knowledge about) which of them are her intentional actions. To put this differently, her *intentional* actions are individuated by her intentions: the agent, by having an intention, knows *why* she is performing a particular action (Anscombe 1969: 80) and thus she is in the unique position to form beliefs about her action that are not gained by observation. Here is a famous example made by Anscombe that illustrates this point:

> "Say I go over to the window and open it. Someone who hears me moving calls out: What are you doing making that noise? I reply 'Opening the window.' […] But I don't say the words like this: 'Let me see, what is this body bringing about? Ah yes! the opening of the window'. Or even like this 'Let me see, what are my movements bringing about? The opening of the window'. To see this, if it is not already plain, contrast this case with the following one: I open the window and it focuses a spot of light on the wall. Someone who cannot see me but can see the wall, says 'What are you doing making that light come on the wall?' and I say 'Ah yes, it's opening the window that does it', or 'That always happens when one opens that window at midday if the sun is shining.' (Anscombe 1969: 51)

Arguably, without the intention of opening the window, the agent simply would not know what it is that she is doing. But if the agent performs an action upon that intention, this puts the agent's perspective within the action itself, as it were: the action is experienced from within and not observed from the outside.[3] Said another way, the agent's knowledge about some aspects of her action is distinctive in the sense that it is not obtained by observation. This is not to deny the relevance of observation to action for "[o]bservation enables the agent to notice and correct mistakes; but what counts as a mistake here is determined by what the agent is doing, and this in turn is to a considerable extent determined by what he intends to be doing" (Falvey 2000: 29).

To be sure, it is an open question in the literature how to understand Anscombe's idea of non-observational practical knowledge (cf. Velleman 1989, Moran 2004, Rödl 2007, Schwenkler 2015). Luckily, we believe that this debate can be sidestepped for the purposes of this article. The paper does not attempt to *positively* characterize what non-observational practical knowledge *is*, but it confines its understanding to the idea that perceptions and cognate cognitive processes *do not justify* - or provide a reason for - the agent's belief of what she is doing (cf. Falvey 2000). What is more important for the paper is the relation between the self-knowledge that accompanies the agent's intention to act and the non-observational practical knowledge (on the minimal understanding just illustrated):[4]

[3] When we henceforth speak of "knowledge from within" or "knowing from within," we refer to the non-observational knowledge the agent has about what she is doing.

[4] Another relevant issue - the treatment of which would exceed the scope of this paper - hinges on the relation between these two states of knowledge: some believe that the relation is inferential, cf. Paul 2009; while other deny this, cf. Setiya 2011.

without the PSA displayed in the intention, the agent would not have the first-personal perspective towards her action that is intrinsic to the idea of non-observational knowledge about the action.

The question is: does any of the above apply at the collective level? At first glance, there are important analogies to be acknowledged between the individual and the collective case. As said above, we take for granted that there are instances of shared agency and that, if the agency qualifies as intentional, then it is so because the agents "share" a corresponding intention. We will not enter into the question of how, exactly, the "sharedness" or "collectivity" of the intention has to be explained in this case: there already are a number of accounts of collective intentions (for a survey, cf. Schweikard/Schmid 2013).

Rather, the purpose of this article is to test whether there is *a* sense of sharing an intention for which *plural* pre-reflective *self*-awareness (or "PPSA" for short) is foundational in the same way in which (individual) PSA is foundational for having an (individual) intention.[5]

Some believe: yes – if an intention is shared by several individuals, the shared intention displays PPSA: "intentional joint action is action which is collectively intended *in terms of an intention of which there is plural self-knowledge*" (Schmid MS: 5, our emphasis, cf. also Schmitz 2016).[6] And, given that self-knowledge about the intention enables non-observational or "groundless" knowledge about the action: "the idea that the participants have groundless knowledge *of what it is they are doing together* makes good sense" (Schmid 2016: 73, our emphasis)[7].

We disagree.[8] Our disagreement is substantiated by an investigation into a real life case of collective agency: in section 2, we begin by introducing the world-renowned Danish String Quartet and analyze the nature and structure of their musical collaboration. In section 3, we describe three different ways in which the musicians can interact, and we highlight their cognitive and affective pre-conditions. It is claimed that one of these forms of interactions is enabled by the establishment of a sense of we-

[5] One can certainly find accounts of collective intentions in the literature that either do not conceptually require anything like PPSA (because they attempt to explain collective intentions without recurring to any notion of a plural subject, cf. Bratman 2014) or that simply do not operate with PPSA (because they employ other notions as *explanans* of collective intentionality, e.g., the we-mode – cf. Tuomela 2007). In addition, it may also be that PPSA itself comes in many forms: recently, Schmitz argued that there are forms of collective self-awareness in joint attention, perception and action, which are "below the level of rationality and reasoning and do not involve reasons and obligations." (Schmitz 2016). The target of this article, however, is only the idea that PPSA is foundational for collective intentions. We are thankful to two anonymous reviewers for pushing us on this point.

[6] Schmid remarks that the four features of self-identification, self-commitment, self-authorization and self-validation works in PPSA differently than in PSA (cf. Schmid 2016). Still, he maintains that these two forms of awareness are species of the same genus or kind.

[7] For another approach to joint action inspired by Anscombe, but which does not appeal to the idea of PPSA, cf. Laurence 2011).

[8] And we are not alone, cf. Blomberg 2017 (forthcoming).

agency among the musicians. The sense of we-agency strongly depends on cognitive and affective processes and it triggers an important transformation in the phenomenology of shared agency. On its basis, the musicians begin to conceive of the joint performance as one single we-action towards which they experience an epistemic privileged access. This phenomenology is unique and depends on the sense of we-agency, but it must be supported and maintained by observationally based cognitive processes, that is, by processes (like auditory or visual perception) that connect the agent's cognitive system with her environment. More precisely, 'supported and maintained' here specifically means that these cognitive processes *justify* the agent's belief about what she is doing.[9] Accordingly, our interim conclusion will be that, whatever it means to share intentions, shared intentions *do not* ground non-observational knowledge about *our* actions. The only way for a participating individual to know what *we* are doing is by observing (in a broad sense, not necessarily restricted to vision) what his or her interactants are doing.

This has consequences for the notion of PPSA. Section 4 generalizes the conclusion achieved in the previous parts of the paper by mounting an argument in the *modus tollens*: If PPSA accompanies shared intentions, then PPSA should be able to generate practical knowledge of a non-observational kind about the collective action performed upon those shared intentions. But there is no non-observational knowledge of the collective action: even the unique form of awareness of the we-action described in this article, which is established on the basis of a peaking we-agency, is and remains *observationally* based. Therefore, we will conclude, there is no PPSA accompanying shared intentions.

2. The Danish String Quartet: Background

Let us start with a few brief methodological remarks. In this paper we will rely on reports by expert musicians acquired via qualitative interviews. Using qualitative interviews to ground philosophical arguments is not a simple or unproblematic affair. It is, however, beyond the scope of this article to engage in lengthy methodological considerations (but see Ravn & Hansen 2013, Høffding & Martiny 2016, Petitmengin 2006). We presuppose what we think is demonstrated in these just mentioned articles, namely that thorough qualitative interviews can indeed be used for the purpose of advancing philosophical arguments. In the following, we rely on such interviews with the musicians of "The Danish String Quartet" [DSQ] and on work by Elizabeth Pacherie (2014) to analyze the nature of their musical collaboration.

i. The Danish String Quartet

[9] Those, who emphasize the role of self-knowledge for practical knowledge, can well agree on the supporting, maintaining and perhaps even enabling role of perception and of other cognitive processes for intentional agency, but they would still deny that these processes *justify* or provide a reason for the agent's belief of what she is doing (cf. Falvey 2000).

Over the last ten years the DSQ (Frederik Øland, violin; Rune Tonsgaard, violin; Asbjørn Nørgaard, viola; Fredrik Sjölin, cello[10]) has become an acknowledged chamber ensemble on the world stage of classical music.[11] The members started their individual training at ages 4-7 and had, at the time of the interviews, played between 22 and 24 years - about 10 of these together in the DSQ.[12] Besides various musical side projects in other orchestras or musical ensembles and concerts in Copenhagen, their home base, they as of recently tour more than one hundred days a year. This history of performance brings their total time playing together to several – if not ten – thousand hours, and thus provides an excellent case study of the experience of group intentionality.

ii. Playing in a string quartet.

Playing in a professional string quartet is a difficult and highly specialized kind of group action, primarily due to its technical and artistic sophistication. This can be described as a goal directed activity because all agents intend to achieve a common goal – namely to play a piece of music in a way that satisfies certain aesthetic criteria. The goal itself is of a peculiar kind. The piece as performed is a whole, a unity that can only be brought about by the interlocked contributions of four musicians. It cannot be understood as a divisible entity, in which each performer contributes 25% of the content. Three musicians performing a string quartet does not add up to 75% of a string quartet, it makes for 0%. Put differently, it is a unity that does not reduce to its parts. To make a contrast case, the construction of a large building surely requires a multiplicity of agents, but reducing the number of workers from 90 to 80 does not make that endeavor impossible, but only slower. A performed string quartet is intrinsically unified, constituted by four equal members.

In addition, to be successfully brought about, the activity requires high expertise and this translates into extensive rehearsal. As mentioned, the DSQ has spent thousands of hours playing together. An outcome thereof is that the musicians know each other in the kind of way intimate friends know each other: they operate in a regime of deep trust and mutual reliability. As we shall see, this notion of trust is quintessential to appreciate the nature of their shared activity.

Adding to these more general features, it is helpful to employ some of Pacherie's distinctions to determine more precisely the nature of the joint action in which the DSQ engages. Pacherie (2014: 34) distinguishes joint actions on the basis of *four* criteria: their structure, scale, degree of specialization, and longevity or transience of the collective. How does the activity of playing in a quartet stand *vis à vis* these four criteria?

To begin with, a joint activity can be seen as more or less hierarchical (think of the hierarchy of military command) or egalitarian (think of a beach volley ball team playing a game). In a string quartet, although the first violinist usually plays the melody and in some sense "leads" the unfolding

[10] To avoid confusion between the violinist and the cellist, we shall henceforth name the former, Frederik Ø.
[11] See: http://danishquartet.com/
[12] Only the current cellist joined later in 2008.

of the musical piece, the setting is structurally egalitarian insofar as each performer fully depends on the other in order for the piece to unfold. A quartet is a symmetrical relation of co-workers.

Moreover, the scale of a joint activity also determines the nature of the experience of the engagement. Whereas a beach-volley ball team consisting of only two players are aware of what each other is doing at all times during a game (victory being premised on such coordination), the foot-soldier on the beach at the Normandy invasion in 1944, to use Pacherie's own example, has very little understanding of the broader scale of whether the mission was going according to plan (Ibid). Since a string quartet always consists of four musicians, it engages in joint action of a small-scale.

If the roles of the participants of a joint action are highly specialized and not interchangeable, this again limits the possibility of equally distributed knowledge. Pacherie adds that if the participants have interchangeable roles: "they may have a motor repertoire allowing them to engage in perception-action matching and motor simulation as well as the knowledge needed to form task representations; they would thus be in a position to precisely represent the goals and actions of their co-agents and make accurate other- and joint predictions." (Ibid). In a classical string quartet, there are three kinds of instruments: Two violins, a viola and a cello. The motor repertoire necessary to master these instruments is certainly similar, proved by the fact that the DSQ occasionally perform pieces (of folk music) where they all play the violin. Nevertheless, asking them to exchange instruments for the performance of just about any demanding quartet piece, would be impossible or lead to a very poor result. Given this contrast, it is fair to assume that, from the perspective of the quality of performance, each player's skill is highly specialized and not interchangeable, but from the perspective of the possibility of action-perception matching and motor simulation, it is the case that each member has a near-identical motor-repertoire sufficient for accurate joint predictions.

Finally, the longevity of a group also impacts the nature of its joint actions. Given the amount of time the musicians invest in the activity and to the relation of trust that obtains among them, one must conclude that the DSQ is characterized by longevity and by a robust and cemented group membership.

3. The Phenomenology of Expert Musicianship: Three ways of playing in the DSQ

The purpose of this section is to highlight some of the many structurally different ways in which musicians can play together and to establish that one of these involves a sense of we-agency. To do so, the line of argument substantially draws on seminal work done by Pacherie on the phenomenology of joint action (Pacherie 2014). In the following, some of her distinctions are put to use in the DSQ case study in order to explicate three forms of musical interaction. Each of these are based on a different, primary cognitive, mechanism. We label each form of interaction by using the term designating their primary mechanism, which are "motor-resonance," "explicit coordination" and "interkinesthetic affectivity". Establishing three distinct forms of musical interaction has several implications for the understanding of joint musical interaction. Firstly, it shows that musical interaction isn't just one thing, but that it can proceed through a range of different conscious and sub-conscious processes. Secondly, it shows that some forms of successful coordination can proceed

without a sense of we-agency. Finally, it shows that there is a (rather rare) form of interaction that seems to entail a strong sense of we-agency.

i. Motor-resonance

Let us begin by dismissing a widespread assumption: *prima facie*, one might think that in order to play well together, members of a small musical group would have to pay attention to what the others are doing. This is also claimed by a number of music psychologists (Seddon and Biasutti 2009, Keller 2008). But in the following example from Asbjørn, the DSQ gives us reason to question the necessity of such awareness.

> So recently, there was this concert, in which Frederik [Ø]… was very moved by a movement of Beethoven, where Rune hadn't noticed at all that he [Frederik Ø] had been crying and Rune decisively hadn't seen it.
>
> *But you saw it?*
>
> I saw it and Fredrik (the cellist) also saw it. And another time on the last England tour, where Rune had all kinds of problems with his shoulder and he had been sitting for an entire Beethoven Quartet in which Frederik [Ø] played 1st violin and Rune 2nd violin, and Rune had been sitting and placed his arm on the thigh whenever he could and Fredrik (the cellist) and I were immediately afterwards towards Rune "Are you ok?" and where Frederik [Ø] hadn't discovered anything what so ever, even if he had been looking at him…

The first situation portrays a musician sitting just next to another who completely fails to notice the other's actions, all the while the performance proceeds smoothly. In the second case cited, Rune has such strong pain in his shoulder that he must rest it at the slightest pause in the music – and, again, his co-performer sitting just to his right is not aware of that. According to Asbjørn, the first violinist tends to "fly out" and more often enters a deep state of absorption in which he is inattentive or even oblivious of the world and, crucially, even of his co-players, around him. We are not going to address this experiential state in any detail (but see Høffding 2015). Rather we are after how Frederik Ø manages to coordinate with Rune, without consciously perceiving Rune's actions.

One account could be that, although Frederik Ø might not be consciously seeing Rune, he is adjusting to him through conscious listening. We do not dispute that in many circumstances conscious listening is sufficient to establish successful coordination (given the right level of expertise). However, it seems that not even conscious listening is necessary for successful coordination. In fact, if Frederik Ø had been consciously listening to Rune, he would have noticed the slight audible changes that follow from the kind of pains Rune was feeling and subsequently realize what kind of situation Rune was in. Most likely, members of the audience would not notice that, but the quartet members are intimately attuned

to one another and perceive the minutest of details and changes. We know of expert musicians' heightened aesthetic sensitivity and general enhanced auditory perception from empirical studies (Kraus & Chandrasekaran 2010, Kraus, Strait & Parbery-Clark 2012). But there is also circumstantial evidence for this claim: the interviewer, when touring with the DSQ, during a rehearsal was asked for advice about which musical emphasis or interpretation was better and, although fairly well-trained in classical music, was completely unable to distinguish one from the other.

In the instance above, we believe that an appeal to sub-conscious mechanisms can lift the explanatory burden of coordination without conscious perception. Pacherie mentions several functions in this regard of which we wish to point to two: entrainment and motor simulation.

Firstly, the DSQ enters into a process of *entrainment*, which can be characterized as follows: "a process whereby two people involuntarily synchronize their behaviour, even in the absence of direct mechanical coupling. Thus, two people sitting next to each other in rocking chairs will unconsciously synchronize their rocking frequency and do so even when they have chairs with different eigenfrequencies" (Pacherie 2014, 31; on entrainment in musicians, cf. Clayton, Sager& Udo 2005, Clayton 2012, Doffman 2011). As a sub-personal process, entrainment can begin to account for the synchronization between Rune and Frederik Ø from the example above. But given the difficulty of coordinating musical expression in a string quartet, it seems implausible that entrainment *alone* can account for such *rafinnement*.

Secondly, the other function that most likely plays a role in this form of interaction, is "motor simulation," by which it is meant that: "the perception of an[other's] action leads to the activation of a corresponding action representation in the observer's action system." (Pacherie 2014, 31) Perception of the other is required for this motor resonance system to kick in, but although the quotation above is supposed to demonstrate the lack of perceptual contact from Frederik Ø to Rune, the example certainly does not rule out instances of unconscious perception (Dehaene 2014). With his eyes saccading (Gilchrist 2011) between his score, the audience and the other players, Frederik Ø is probably picking up quite a bit of visual information from Rune, although without being phenomenally aware of it.[13]

If these considerations are on the right track, one could establish that coordination can take place even in the absence of conscious perceptual contact and, further, that this can be explained with reference to sub-conscious processes. In this case, it is sensible to argue that the individuals are so immersed in

[13] We have stated that motor-resonance is unconscious, but this claim can (and possibly should) be relaxed: although entrainment can occur without consciousness, such as when rocking chairs synchronize, and although implicit motor simulation is characterized as the activation of a sub-conscious brain-system, a minimal form of consciousness might accompany entrainment and motor-resonance. The point here, however, is that even if there is some subtle and vague form of pre-reflective consciousness at play in entrainment and motor-resonance, in the aforementioned DSQ case, it certainly does not penetrate into an awareness that consciously guides the joint performance. We are thankful to an anonymous reviewer for pointing this out.

the performance that they adapt their actions to the other agents' contributions automatically and without paying attention to those contributions. In the example of Rune's hurting arm, Frederik Ø is "out" thinking about or imagining something apart from the actual performance, Rune is focused on his pain, while the violist and cellist are aware of this lack of communication and understanding between Frederik Ø and Rune. This example signals that, although the DSQ-musicians certainly knew that they were contributing to *one action* (i.e., the group's performance), *none* of the members was adopting the group's perspective towards the performance, which – as it will be highlighted below – is quintessential for the sense of we-agency.

Put differently, musical interaction can unfold *without* a sense of we-agency. All musicians access the collective performance from an I-perspective – the attempt being to coordinate several I-actions in order to perform a we-action. However, none of the musicians have a feeling of performing the we-action in the same sense in which each of them has the feeling to perform the I-action. Importantly, however, such lack of a sense of we-agency does not necessarily undermine the achievement of the goal: the performance can be successfully accomplished as intended. We will return to what the experience of we-agency more precisely consists in later on.

ii. Explicit coordination

The kind of unconscious coordination portrayed above is not the most usual kind of interaction between the DSQ members. When observing chamber ensemble musicians playing, one very often sees intentional communication in form of body language or facial expressions – cues in the form of winks, blinks and laughs. Sometimes, like in the case of Rune addressed above, there might be an element disturbing the unfolding of the performance and this may call for compensatory strategies. In the following, one can find Asbjørn speaking of two opposed forms of playing together:

> You get afraid of, you don't really dare trusting it… I know I have to be together/in sync with Rune in something in three seconds, then I know that if I look at him and try to be together with him, then I know that it will be together and then it is perhaps not that idealistic and in the zone, but at least we are together and there you might be afraid in trusting that you are together, you become afraid of trusting the "hive-mind" and the "zone-forces" and at that point it might be, if it is a scary concert, that you choose this solution, which is not entirely ideal.

For now, we focus on the situation that is marked by a lack of trust and reserve the "hive-mind" and "zone-forces" metaphors for the next section. The situation Asbjørn portrays differs from the previous one – in the scenario described before, Frederik Ø seems to be totally immersed in his individual I-playing and relies on sub-conscious processes to coordinate with the other DSQ members. Here, by contrast, Asbjørn finds himself playing with Rune, but feels uncomfortable and uncertain whether they are adequately coordinated. In such a "scary concert," he chooses "a solution, which is not entirely ideal." He focuses his gaze at Rune to "try to be together with him," that is, he tries to match

his own movements with his prediction of Rune's. Asbjørn's "trying to be together" with Rune indicates a lack of we-agency, for which the focusing of his gaze is supposed to compensate.

Asbjørn's actions are based on attentive visual perception and prediction of Rune's play. The form of coordination that emerges could hence be characterized as "explicit" – it is explicit because it emerges from conscious, explicit and deliberate attitudes that Asbjørn take up to compensate for the risk of not being together in the first place. The sense of agency here is almost antagonistic: Whereas in the previous scenario the "you" and an "I" are almost completely implicit (at least from Frederik Ø's perspective), here they are fully explicit and at constant risk of miscommunication and miscoordination.

As with the form of interaction running solely off subconscious resonance mechanisms, explicit coordination is also not the most ordinary form of musical interaction. The DSQ members normally enjoy playing together. They trust in each other, and in peak instances of such trust, their interaction seems to rely on a different mechanism.

iii. Interkinesthetic affectivity[14]

Back to Asbjørn's curious metaphors of the "hive-mind" and the "zone-forces". Asbjørn is an enthusiastic gamer and the "hive-mind" refers to hive dwelling aliens that although composed of a large number of individual bodies act as if parts of one large organism. In the DSQ setting, these metaphors refer to a scenario in which Asbjørn trusts the agentive situation and in which he then does not have "to try to be together with [Rune]". Let us probe the meaning of this regime of trust, as a mark of an altogether different kind of coordination – Asbjørn goes further:

> It is just such a special feeling, if we perform a concert and there is a movement where it just clicks, because I've playing a lot of computer and sometimes demanded what I call "hive-mind"… where you have this feeling that I know, without knowing, I know what Frederik will do in 3 seconds and then I can do something that matches damn well, and then, I have also talked about as if it is a bubble…
>
> When you perform in the quartet, you know precisely when to play the tones, you know what the others are doing without looking at them. When everyone in the quartet is in this state, it is just like there is a bubble of sound over every ones' heads that you can just form as you wish.

Asbjørn somehow "knows" what his co-players will do before they do it and this knowledge is characterized as a feeling. The certainty or sense of control he has over his own technique comes to apply equally to the other musicians, to the extent that his sense of what he will do next is given on a par with what the others will do. Although he says that he knows "what Frederik will do in 3 seconds,"

[14] This term is taken from Behnke 2008.

this is not the kind of prediction as the one of "explicit coordination". Rather it points to a kind of affection, a feeling of intimate trust in the situation. Here is how Rune describes it:

> But I also enormously enjoy closing my eyes, even if we play very slowly and then trust that the other…that we follow one another, feel the energy, *here* we shift the bowing, that it does not become a thing of vision, but that you can sense it, *there* is the bow-shift, right?

Let us describe in detail the kind of situation Rune and Asbjørn point to: What Rune reports might be interpreted as an agentive coupled system relying on a) auditory perception, b) affectivity, c) interoception and d) intersubjective proprioception or interkinestesia.

a) *Auditory perception*. In the first place, Asbjørn and Rune share a focus on non-visual perception: "You know what the others are doing without looking at them" and "I enjoy closing my eyes". A clear distinction between explicit coordination and this form of interaction is the reliance on different modes of perception. In explicit coordination, detailed visual, perceptual knowledge is called for to compensate for the lack of trust and mutual understanding. In this case, by contrast, coordination is already in place (most likely, in virtue of motor resonance) and the DSQ members can instead focus on listening, which apparently is connected to, or even enhances, a sense of trust and being together. They state that their need for visual communication decreases year by year and that musical intentions simply are more keenly perceived through hearing.

b) *Affectivity*. In a recent paper on the phenomenology of joint action that nicely complements Pacherie's work, Salmela and Nagatsu (2016) suggest that an essential element for the emergence of a sense of we-agency is affectivity: acting together "feels good" (Salmela and Nagatsu 2016: 18), but the contribution of affectivity to joint action is not restricted to that. In particular, they highlight the importance of *shared* emotions for the sense of we-agency and identify a specific case of interaction where the role of emotions felt together by the agents become particularly salient. These are ritualistic interactions that have "internal goals and standards of excellence […], such as staying in the same rhythm when we are dancing or singing together, doing some difficult part of our joint performance, and completing the performance rather than interrupting it. Shared emotions may emerge as rational responses to jointly achieving or failing to meet those internal norms of rituals" (Salmela and Nagatsu 2016: 15). It is sensible to subsume musical interaction under the kind of activity that has internal goals.

It is generally agreed that "sharedness" of emotions come in degrees and that it is accompanied by a sense of *us*-ness (Salmela 2012). This is crucial for the description because it allows the identification of those cases where the achievement of the activity's internal goals together with the contributions by all other factors listed in this section can lead to emotions with a peaking sharedness character – that is, with an accentuated sense of *us*, that is, a sense that *we* are playing together. Note that this is compatible with the enhanced sense of trust that the DSQ members report to have when playing in this way. Immersing oneself in one's hearing and in reciprocal trust has become cues for good and pleasant musical interaction for the DSQ. The nature of the trust at stake here is not a kind of explicit

knowledge that "if I do x, then you do y", but a feeling that we are together and can give each other room to pursue a novel musical idea without the slightest doubt that everyone else will follow.

c) *Interoception.* Playing together is interoceptively mediated. This might sound surprising, but one should not underestimate the following consideration: sound has the capacity to penetrate into objects, and more importantly, into bodies, through vibrating sound waves. When a musician says that she can *feel* the fellow musician's playing, in addition to the straightforward emotional meaning, it also literally means that she feels the vibrations of the other's playing in her body. This consideration might help appreciation of the intercorporeal dimension of playing together. It is not a metaphor to say that the musicians' bodies touch each other through the sound they produce. Where the visual modality establishes distance, separation and a clear sense of boundaries between the DSQ members, interoception supports the sense of touching one another and being part of a corporeal unity.

d) *Intersubjective proprioception (interkinesthesia)*. Finally, perception and reciprocation of the other's movements through hearing and interoception, especially when they are accompanied by a shared emotion, might lead to intersubjective proprioception or interkinesthesia.[15] When Rune says: "*here* we shift the bowing," he seems to be referring to a situation in which he experiences the other DSQ-members' bow-shifts as intimately as he does his own.[16] Apparently, as his knowledge of the position and movement of his own arms is proprioceptive and non-observational, likewise is his sense of the position and limbs of the three others in that particular bow-shift. Such a proprioceptive access to the other's movements can be labeled as "interkinesthesia" or the joining of body schemas, a point to which we return below.

It is hard to grasp the sense of contact in intersubjective proprioception. Let us attempt to clarify this point through the example of the sense of coordination between two Olympic-level rowers, Juliane and Anne:

> [T]he coupled situation calls for the rowers to find a common ground. This means that Juliane's movements are also interwoven in, and affected and regulated by, Anne's movements. Juliane seems to use her impediment in reaching an optimal state as a measuring stick for grasping Anne's level. Furthermore, Juliane describes that she uses the coupled situation to "carry forward some sensations" and "impact the rhythm physically". This indicates that Juliane pursues the feel for the good rhythm not only through her own body but also through Anne's body (Leder, 1990; Fuchs & De Jaegher, 2009) and is able to use the felt intersubjective kinaesthetic qualities as a launch pad to influence the joint rhythm. (Lund, Ravn & Christensen 2012: 184)

[15] See He & Ravn (forthcoming) for an example from dance on the sense of shared intentionality in a joint project.
[16] It might even be that what Rune describes is an experience of a form of synesthesia between hearing and tactile perception.

When rowing a double scull, the front rower can see the rear one, but not the inverse. Their communication is not primarily verbal, but the kinesthetic dimension of the interaction is communicatively salient: kinesthesis is felt in the oars as extended limbs through the medium of the water and the boat itself. For Juliane to get a feel for the good rhythm, it is inadequate for her to just set a certain pace. She must feel and incorporate Anne's pace through the medium of the ores in the water to get in sync and must continually adjust her own desire for a certain rhythm to that of Anne. Her sense of agency is at the same time delimited and extended to that of Anne. Similarly, in the case of the DSQ-members, the instruments can be seen as the analogues of ores and the played music as the analogue of water. If this is correct, then the DSQ members could be considered as being directly coupled through this joint system that envelops them all. The coordination that is generated from this kind of coupling is not primarily one of explicit prediction – although that might be involved – but rather a form of kinesthesia.

This third kind of musical interaction appears to validate the idea of a "joint body schema" (Soliman & Glenberg 2014). There is well-established evidence for changes in the experience of peripersonal space (and its underlying neural basis) during tool use, often described in terms of the incorporation of tools into the agent's body schema (Berti & Frassinetti 2000; Farnè et al. 2005). For example, Maravita and Iriki (2004) showed bimodal neurons in the parietal cortex have both somatosensory and visual receptive fields focused on the hand. Thus, neuronal activation increases for the visual receptive field as one looks near one's hand. After use of a tool that extends one's reach (e.g., a rake), the visual receptive field of these neurons expands to include the effector end of the tool. In other words, peripersonal space extends to include the area around the distant end of the tool. The same kind of extension of peripersonal space can be found during joint action. In an experiment involving two people coordinating their joint action on the task of sawing through a candle using a string that they kept taut as they were moving it back and forth, Soliman and Glenberg (2014) demonstrated, using complex visual vs tactile interference measures previously used to demonstrate incorporation of tools and extension of peripersonal space during tool use, that peripersonal space expanded to include the space around the other participant. They describe this as the establishment of a joint body schema "to incorporate the kinematics of partners" (Soliman et al. 2015). In effect, a form of what Merleau-Ponty calls 'intercorporeity' emerges from joint action and various forms of intersubjective interaction. We are suggesting that in music performance of the sort that involves interkinesthetic affectivity, one's body schema or peripersonal space extends to include, not just instruments, but also the other players (cf. also Blomberg 2011, Heed et al. 2010, Teneggi et al. 2013).[17]

Having differentiated these three mechanisms (motor-resonance, explicit coordination, interkinesthetic affectivity), it might be important to now turn to their reciprocal relations. On the one hand, we have suggested that, when the interkinestethic affectivity is lacking and the DSQ-members feel a lack of trust, explicit coordination seems to be able to save the day. Interkinesthetic affectivity on its own is sufficient, though apparently not necessary, for successful joint performance. On the

[17] But it should not go unmentioned that, within empirical literature, there is some disagreement on the impact of others on peripersonal space (cf. Holmes et al. 2004, Holmes et al. 2007).

other hand, interkinestethic affectivity and explicit coordination do not have to be mutually exclusive bases for interaction. If interkinesthetic affectivity is functioning, it does not prevent the musicians from explicitly communicating, observing or predicting the other player's performance (cf. Montero 2010 and Sutton et al. 2012).

As for the relation between explicit coordination and motor-resonance, it's plausible that the former relies on the latter. As soon as you have visual contact – involving conscious perception or not – you get the requisite motor-mechanisms going. Inversely, as we have tried to show in the first example, one can indeed play together by means of mere motor-resonance without having to explicitly coordinate. We believe that it is in cases of a lack of felt trust that explicit coordination becomes necessary for successful joint performance.

How about the relation between motor-resonance and interkinesthetic affectivity? As a subconscious mechanism, motor-resonance probably underpins interkinesthetic affectivity to help ensure the overall coordination. We may also conceive of motor-resonance and interkinesthetic affective as located on a continuum. Even if conceptualized as non-conscious, entrainment, mirror-resonance and body schemas, joint or otherwise, surely become more and more refined and attuned with practice. However, only when coupled with the affective intentionality of deep trust, does the change in agency from singular to plural come about. Interkinesthetic affectivity is a phenomenological or experiential aspect of playing together, which arises when trust and shared affect are at the forefront of experience and which makes explicit coordination unnecessary. In the first example Frederik Ø is inattentive to Rune and we have stipulated that here motor-resonance explains how playing unfolds in a perfectly coordinated fashion nevertheless. In this case, however, although there is no marked sense (or phenomenological registration) of interkinesthetic affectivity, we believe it still operates in a weaker form in the experiential background. We think so because, in any case of playing together, auditory perception, and interoception are necessarily present, although in this particular case only tacitly. Again, motor-resonance and interkinesthetic affectivity may be described as two extreme poles in a continuous process. Only when appearing in the foreground of awareness (Colombetti 2014, Legrand 2007), however, do the components of interkinesthetic affectivity give rise to its fullest expression, which is where the alteration from singular to we-agency most saliently takes place. Consider a further description from Fredrik.

> […] there were a couple of times where I was surprised by where we were going…. Suddenly we find ourselves in a tempo we hadn't planned for at all, but we couldn't have done otherwise, because the preceding notes leading into it, they had laid the ground for it. And then you cannot get out of it.

Fredrik reports feeling that the music is going somewhere not planned for and is surprised by how it moves, but at no point does he indicate that the DSQ members are not fully synchronized. This is described as a pleasant experience in which they are fully tuned to one another and coordinate to microscopic bodily movements. Again, an unplanned change of tempo happens and everyone follows along, and although the entire quartet might be surprised by where it was going, none of them could

say that it was "he" who had initiated the change. This clearly signals an altered sense of agency. More precisely, the fact that they all followed unencumbered indicates that this altered sense of agency is a *shared* one.[18] Experiencing the performance in this way, it seems, is experiencing the performance as something that *we*, together, are doing. Instead of feeling the performance to flow out of my singular and individual effort, I feel it as the result of our collective and fused effort. In other words, I experience the we-action *from within* the we-action itself – that is, I do not experience the we-action as something that is brought about by my I-action coordinating with other actions. I rather experience bringing about the we-action.[19]

The interim conclusion, hence, is that interkinesthetic affectivity is unique in generating a feeling of we-agency, a "hive-mind" in which one's own perception-action loops are coupled to other bodies (in an intercorporeity that is also describable in terms of in joint body schemas or the experience of extended peripersonal space), and thus loop intersubjectively.

4. Plural Pre-reflective Self-Awareness.

In illustrating the possibility for the four musicians to develop a sense of we-agency, our interim conclusion also illustrates that it is only in certain cases that this happens. In all likelihood, such a sense of agency comes in degree (as all its ingredients like trust, the intensity of the collective emotion, etc. come in degree) and it peaks when interkinesthesia is at the forefront of the DSQ members' experience. Once it is in place, the sense of individual agency is transformed – one feels totally absorbed by the group's activity. This is a fragile and unstable condition – one, however, that is facilitated by the kind of interaction at stake and by the other conditions mentioned in the previous two sections.

It is now time to turn to the form of practical knowledge encapsulated in interaction and to our initial question of whether this knowledge has the same features as in individual agency. Remember we have assumed from the start that the musicians *share the intention to play the piece*. The shared intention is the element that steers and governs the DSQ's action. [20] What we are after here is whether

[18] Importantly, as indicated by Fredrik, the change in the sense of agency is not merely from an "I" to a "we". It is also a change from an "I do" to a "this happens to us". You experience the music as an agential system whose "will" you must subject yourself to in order to deliver an authentic performance. It is of great interest, but beyond the scope of the paper, to flesh out the way in which some sense of agency is relinquished to the music, while another form of agency, experienced as "trust" or "freedom" is enhanced. Preliminarily this would support Salmela and Nagatsu's point that individual agency and we-agency are not opposed but complimentary (2016).

[19] This is in line with the phenomenon of "boundary loss" in joint action described by Pacherie (Pacherie 2014, 40). Note, however, that one of the conditions Pacherie mention for the emergence of this phenomenon, i.e., the similarity of the actions performed (her example is a military march) is not equally fulfilled in the DSQ's case – here, the musicians' actions are similar only on a coarse-grained scale.

[20] To reinforce our point, we believe that there is a clear difference between the notion of highly synchronized or coordinated actions and the idea of a joint or collective action (cf. Sánchez Guerrero 2016: 80f) and we take

there is a sense of sharing an intention that displays plural self-knowledge – analogous to the sense in which having an (individual) intention displays self-knowledge. If that were the case, then the group would have an immediate, non-observational access to the we-action identical to the one advocated for the singular case. This seems to be Schmid's view: "knowledge in question [i.e., the knowledge at stake in joint actions] is plural pre-reflective and non-thematic self-awareness *of what it is the participants are doing together*" (Schmid 2016: 51, our brackets and emphasis).

However, the result of our study about expert musicianship indicates that the epistemically privileged access to the we-action is not of the same kind as the one exemplified in the singular case. In addition, it shows that such an access is granted only in certain cases and that it is granted only to individual agents, not to groups.

To see why, let us first look into cases where no sense of we-agency has been established, that is, into cases where the sense of individual agency has not undergone any transformation – for instance, when the interaction runs either on motor resonance alone or is coupled with explicit coordination. Here we have individuals who adjust their I-actions to the actions of the others agents – either unconsciously or consciously. As emphasized above, there is no reason to deny that, when this happens, the level of coordination can even peak, making the overall performance a success.

However, for the adjustment to be achieved, substantial cognitive resources have to be allocated to *observational* means. They are observational in the broad sense according to which they track something in the world and they make information available to the agent. When the interaction is based on motor resonance alone, these means are merely sub-personal: the agent has information about the others' action that is not processed consciously (cf. Huebner 2013). She adjusts her behavior to events and facts in the world, although she is not consciously attending to them. By contrast, in explicit coordination it is by observing and monitoring what the fellow musicians are doing that coordination is enabled and the performance unfolds. In other words, processes like conscious observation, prediction and inference are here required for the action of playing the quartet to be performed (the joint action would just not have taken place without those processes). In both cases (motor resonance and explicit coordination), each musician has first-personal knowledge about the *singular* contribution each of them provide, i.e., about the I-action each of them performs, whereas knowledge of the joint performance is third-personal – because knowledge of the other's actions is third-personal and inferential.

Now, this is what the musicians report when the sense of agency has undergone transformation:

> […] where you have this feeling that I know, without knowing, I know what Frederik will do in 3 seconds and then I can do something that matches damn well, and then, I have also talked about as if it is a bubble […] When you perform in the quartet, you know precisely when to

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the view for granted that the latter idea is to be explained by referring to shared intentions. Our argument only targets the view that there is a sense of sharing an intention which displays PPSA.

> play the tones, you know what the others are doing without looking at them. When everyone in the quartet is in this state, it is just like there is a bubble of sound over every ones' heads that you can just form as you wish.

The musicians report knowing what the others are doing or will be doing more by an immediate feel (inside the bubble) than by observing and inferring ("without looking at them") – at least, this is compatible with the conceptual framework developed so far. Accordingly, the players *seem* to have non-observational and non-inferential knowledge about the collective action – and, hence, they could be said to experience the collective performance from within the action itself. This claim, however, requires a more precise assessment and the remainder of this article is devoted to its evaluation. To begin with, the term "non-observational" needs qualification.

On the one hand, the phenomenology of agency undergoes a transformation with the emergence of a sense of we-agency: the experience of performing the we-action *presents* itself to the agents in a non-observational way. That is, once the sense of we-agency is in place, it enables the musicians to adopt a perspective that lies within the collective action itself. The I-action and the you-action are not any longer experienced as something to be done *in order to* bring about the collective action identified by the shared intention. To put this another way: they are no longer conceived of as singular contributions *by means of which* the we-action is performed (cf. Salice 2015). Rather they are now conceived of as one we-action, towards which the agents experience to have an epistemically privileged access. The we-action is experienced as ours with an immediacy that closely resembles the one at stake in individual action and, consequently, it can be said that the awareness about the we-action presents itself to the musicians as non-inferential. Without such sense of we-agency, the musicians can certainly be aware of the fact that they are performing one we-action, but this awareness is gained by means of conscious inferences: I know that a we-action is in the process of being performed because I know that my I-action aptly interlocks with your I-action. In addition, the practical knowledge emerging together with the sense of we-agency is not about a coarse action (the underdetermined fact that the musicians are playing a piece together), but it rather concerns fine-grained aspects and features of the action itself (the rhythm, the interpretation of the piece, its emotional message, etc.). It can be presumed that the more intense the sense of we-agency, the more specific the action identification. All this makes the practical awareness at stake in these circumstances fairly unique.

On the other hand, it should be pointed out that a large part of the cognitive processes that need to be in place for the sense of we-agency to be triggered include a mixture of personal and sub-personal processes. Some of them, such as those of motor-resonance, simply are inaccessible to consciousness, but all of them secure information via salient cognitive relations with the world. Accordingly, information about the world (and specifically about the actions of other agents) grounds and remains a necessary condition for the transformation of phenomenology in we-agency. Without these processes there would be no sense of we-agency and without the sense of we-agency the musicians would not experience any privileged access to the we-action. Put another way: even if, phenomenologically, practical awareness in we-agency *presents* itself as non-observational, it is not – for it is *justified* by important observationally based cognitive relations between the individuals.

Such relations provide reasons for the agents to believe that they are performing one we-action, although these reasons are not consciously accessed.[21]

Having assessed the form of practical knowledge encapsulated in musical interaction, it is now possible to turn to the notion of PPSA. First, recall that singular PSA was portrayed as a form of self-knowledge displayed by the subject's intention, which is able to secure non-observational knowledge about the subject's action. Now, PPSA, according to the claim under scrutiny, is as a form of self-knowledge, which is foundational for the group to intend to φ and which puts the group in the *subject* (not in the content) position of the awareness (that is, the 'self' the knowledge is about is a plural self and not an individual self). Our considerations reject this understanding of PPSA as untenable. It is untenable because, if such PPSA were in place, then the group (and the musicians as the group's members) would acquire genuine non-observational knowledge about the performance just in virtue of the mere fact of having the intention to play together. However, it has been shown that, although the phenomenology that accompanies these cases of interaction can diverge substantially, the only way to secure knowledge about the we-action is by (consciously or unconsciously) observing it as arising out of the coordination between several individual actions. Even in the case of interkinesthesia, where practical knowledge presents itself to the agents as non-inferential and non-observational, the agents' cognitive, observational mechanisms are still online and deeply entrenched. But all this just means in a nutshell: if there were PPSA, it should be able to directly ground the group's practical knowledge of a non-observational kind about the we-action. But it can't, for there is no genuinely non-observational knowledge about the we-action. Therefore, there is no PPSA accompanying shared intentions.

Note that this is *not* to say that the agents cannot be aware that, in sharing an intention, they belong to a group (an awareness linguistically formulated along the lines of "I am aware of being member of us" or "I am aware of us sharing an intention"). This would be a form of awareness that an individual has about herself being a member of a *plural self* or about a *plural self* intending to φ. Note, however, that this state of awareness has the individual self in the subject position of the state and puts the group, *us*, in the content (not in the subject) position (that is, the awareness at stake is not plural self-awareness). If understood in this sense, there is no reason to dispute that the agents (can) have such awareness. And it could be even conjectured that having this awareness facilitates the emergence of a sense of we-agency and hence the establishment of phenomenologically unique practical knowledge about the collective action.

5. Conclusion.

Let us conclude by highlighting some of the challenges that defenders of the PPSA-thesis would face to counter the presented arguments. First, they carry the explanatory burden of showing how genuine PPSA *does* exist in the DSQ case and, consequently, explain why this is not able to generate non-

[21] Obviously, this does not mean that the musicians are 'mistaken' in any sense. Quite the contrary, it just means that a novel aspect has emerged within the interaction.

observational knowledge about the we-action. One sensible reply here could be that the DSQ's unique phenomenology of practical awareness is the best one can get at the collective level: collective agency is not individual agency and, hence, certain properties of the latter do not apply to the former.

But then, two further obstacles would need to be overcome. The first obstacle is that the DSQ experience of we-agency presupposes an extraordinary degree of expertise as spelled out in Pacherie's *four* criteria of: structure, scale, degree of specialization, and longevity or transience of the collective (2014: 34). It is arguably contra-intuitive to limit the notion of collective agency only to those cases that fulfill these criteria. The second obstacle is that, even if these four factors are all in place, a strong sense of we-agency emerges incredibly rarely. Without the expertise in question, such strong sense of we-agency never gets off the ground. Interkinesthetic affectivity and the sense of we-agency experienced on rare occasions by the DSQ is clearly a property incipient in certain form of practiced group agency, not a foundational aspect of collective agency.

Acknowledgments. Preliminary versions of this paper were presented at the "Whole Day Seminar" (Center for Subjectivity Research, Copenhagen, December 2015) and at the "Body Of Knowledge" conference (Los Angeles, December 2016), where we received much appreciated feedback. We are also very thankful to Olle Blomberg and Glenda Satne who have read and commented on the manuscript. The paper also profited from discussions had with Lilian O'Brien. Finally, our gratitude goes to two anonymous reviewers, who have helped us improve the paper.

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