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The construction of meaning within free improvising groups: a qualitative psychological investigation

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Abstract

Improvisation represents a unique process of social creativity in real time, practiced in widely varying musical contexts with different levels of experience. Yet psychologists have mostly studied the practices of individual jazz soloists with an expectation that shared understanding, knowledge and technical abilities are a prerequisite for group improvising. A qualitative study interviewed six trios of free improvisers (n=18) to illuminate the processes of shared musical improvisation across a range of contemporary artistic practice. Comparison of different members' accounts of events during recorded free improvisations indicated that their understandings of who did what and why converged at some points, notably during relative stasis, and diverged at others. Improvisers anticipated and interpreted musical behaviors of their collaborators with reference to previous shared social or musical experience, but considered that such expectations could, and should, be confounded. Familiarity between improvisers could be seen as helpful in building trust within dynamic and highly uncertain musical contexts, and in allowing a less conscious approach to interaction. Improvisers individually assumed that their group shared certain tastes and asserted that others recognized certain musical material as connected to previous practice together. These ideas of shared tastes and practices could best be understood as constructions within this particular social context, since they were not necessarily consistent across the ensemble. The findings emphasize the fundamentally social nature of improvising: shared understanding is not a prerequisite for participation, but shared experience over time enriches the resources of meaning an individual can bring to their interaction in an improvising group.

Keywords

Improvisation, music, creativity, qualitative, groups

Introduction

Improvisation has attracted growing research interest as an artistic practice that is creative at the level of the performer, rather than involving simply the reproduction of existing music (MacDonald & Wilson, 2014; Sovansky, Wieth, Francis, & McIlhagga, 2016). Since it takes place in performance, it also represents spontaneous creativity (MacDonald & Wilson, 2014). Psychological literature on this topic is primarily focused on the experience and activity of individuals, partly through a focus on jazz as a genre where improvisation plays a central role. Featured improvisers in jazz groups are termed 'soloists'; despite usually being accompanied, famous solos are routinely treated and published as individual acts of creativity in isolation from the ensemble context of their production (e.g., Parker, 1978). Generative models for such prodigious improvising likewise focus on the individual level, examining the construction of a solo line as one improviser's 'work' (e.g., Johnson-Laird, 2002; Norgaard, 2011; Pressing & Sloboda, 1988; Schütz, ~~2011~~ 2012). Yet improvisation is an essentially collaborative and therefore distributed form of creativity (Doffman, 2011; MacDonald & Wilson, 2014; Sawyer & DeZutter, 2009). Any one improviser's musical output can only be fully understood in relation to the context of its production: a loud and rapid ascending run on the piano performed over other band members' quiet sustained sounds has distinct implications from those it might have within a torrent of equally busy improvising.

Some researchers have examined jazz improvisation at the interpersonal level (Bastien & Hostager, 1988; Biasutti & Frezza, 2009; Seddon, 2005). These studies, typically interviewing jazz musicians who have improvised together,

suggest that they coordinate their input around culturally available conventions for the genre drawing on an internalized repository of idiomatic elements (melodic motifs, harmonic progressions or rhythms that represent common practice in jazz). Instruments played and roles within an ensemble, such as soloist or accompanist, also provide a framework of expectations through which jazz improvisers can interact (Monson, 1996). For instance, in saxophonist John Coltrane's influential jazz quartet of the 1960s, McCoy Tyner's solos on piano were characteristically filled with rapid scalar patterns in the right hand; yet his accompaniment when Coltrane was understood to be soloing is characteristically structured into chordal stabs or sustained voicings. Through cultural awareness, experience of playing together, or a combination of the two, both men had come to recognize such roles and structures as appropriate to their shared practice.

The idea that players are operating within similar conceptual frameworks has thus been of some interest in psychological research into improvisation.

Comparisons are widespread in the literature and among musicians between group improvisation and the use of language: two or more individuals who share subjective understandings of definitions and grammatical rules can generate a conversation in real time through the creative combination of words (Sawyer, 1996, 1999). Yet verbal language is characteristically structured into turn-taking, and involves a level of semantic signification beyond music. Team sports such as football may be considered to offer a useful analogy, as a dynamic, fast paced and largely non-verbal social activity. Reimer, Park and Hinsz (2006) have argued that shared mental models based on explicit culturally available constraints allow individuals to anticipate and coordinate their various actions implicitly

towards team success in different situations as they emerge. However, while teams may act creatively to achieve a common aim, sports are defined by a fixed objective (e.g., goal scoring) and established rules governing behavior towards that objective. Improvised music, on the other hand, is prized for what pianist Duke Ellington referred to as 'the sound of surprise' (Balliett, 1960); higher aesthetic value is attached to a performance that is perceived as distinctive or unlike previous performances (Sawyer, 1996).

Improvised group music, then, represents a distinct category of social creativity and one deserving of further research into the role of shared understanding. Shared representations of improvisation have been found to be associated with heightened mutual engagement (Bryan-Kinns, 2013) and recent research into mental life of jazz improvisers (Schober & Spiro, 2014) suggests that their degree of shared understanding at any point while playing together is likely to sit on a continuum between extremes of collaborative and individual practice. Schober and Spiro (2014) however identify a number of corollary questions arising from their observation that jazz improvisers' understanding may vary in the extent to which it is shared. Improvised music-making is a highly complex activity; it is not known whether some aspects may be more amenable to shared understanding than others, or in what instances or respects shared understanding may be less of a priority. While it is often taken for granted that personal familiarity or congruence of musical objectives and backgrounds may foster mutual understanding between improvisers, there is a need for psychological research to clarify what influence these factors may have. Social influence is a complex and nuanced process unlikely to operate in a uniform

way, and may indeed operate counter to our intuitions. The pedagogy of improvisation in its widest sense is relatively embryonic (Biasutti, 2015; Hickey, 2009), with leading practitioners often describing highly idiosyncratic routes to learning (MacGlone & MacDonald, in press), and group learning and assessment are inescapable within this field (Hickey, 2015). The teaching of improvisation could therefore be improved with clearer evidence of the implications for creativity of group dynamics and relationships between performers. Benefits to creative practice and the development of creative practitioners may accrue if performers gain a new perspective on longer-term collaborations that they may rarely discuss amongst themselves (MacDonald & Wilson, 2006).

Furthermore, the psychological literature on improvisation discussed above has overwhelmingly considered performance within the genre of jazz, relying heavily on interview data from practitioners. Jazz musicians' accounts of improvisation have been found to reflect the particular professional milieu of that genre (Wilson & MacDonald, 2005, 2012). It has been argued that the widely prescribed constraints on improvisation of learned material and familiarity with a canon reflect the need within jazz to reproduce a recognizable genre rather than constituting prerequisites for improvising per se, given that this is an activity engaged in from infancy (MacDonald & Wilson, 2014; Trevarthen, 2002; Wilson & MacDonald, 2015). There is therefore a research imperative to investigate how and whether shared understanding manifests itself in other genres and contexts. Free improvisation, increasingly prominent within current cultural practice and a mainstay of music therapy, raises further

issues in this respect (Wilson & MacDonald, 2012). Expectations within this field of practice are such that players do not prioritize, or will seek to avoid, stylistic constraints (Canonne & Garnier, 2011) and improvisers may collaborate across radically different musical backgrounds or levels of expertise or training. A recent empirical study of free improvisers found that individuals participating in group improvisation accounted for their decisions at any given moment primarily in terms of whether to maintain or change what they were doing (Wilson & MacDonald, 2015). If changing, the options they perceived were to initiate a new musical direction or to respond to someone else's action. If responding, the options they described were categorized as: adopting what a fellow improviser was doing; augmenting or modifying the other improviser's input somewhat; or providing a contrast to another player or other players' contribution. However it was not explored whether different players within the same ensemble accounted for each others' actions in the same way; in other words, whether understandings appeared shared across the group.

A recent study has explored shared mental models among free improvisers, concluding that these can be developed through ongoing collaboration (Canonne & Aucouturier, 2015); by consistently improvising together, it is argued, free improvisers can acquire a shared repository of practice even if this does not represent skills or conventions transferable to other situations as might be the case in generic music. Social constructionist theory provides an alternative possibility, holding that social relationships and identities are constructed anew in each social context rather than consistent internal selves being brought to bear on each new situation (Potter & Wetherell, 1994). A social constructionist

understanding of interaction during improvisation implies that every sound or silence fielded has implications within that context for its originator and for each of those hearing it; the implications perceived by these individuals may coincide to a greater or lesser degree, or not at all, whatever their previous shared experience. In a recent qualitative study, trios of free improvisers were recorded performing and subsequently interviewed in order to describe the processes of shared musical improvisation and to take better account of the full range of practice. Analysis of data relating to how individual participants accounted for their own choices during improvisation has been reported (Wilson & MacDonald 2015). In this paper, a separate analysis of these data (with one additional trio) is presented which compares how different group members account for the same passages of improvisation, and examines how individuals within a group perceived or constructed each other. This analysis addresses the issue of whether these improvisers can be considered to share understanding of their musical interaction, and seeks to answer the following questions:

- How and when might free improvisers within a group converge or diverge in understanding of their joint activity?
- How might their musical behavior be shaped by social relations?
- Can interaction during group improvising be considered a process of social construction?

Methods

The study employed qualitative methods, some of which are reported in greater

detail in Wilson and MacDonald (2015). Trios of improvisers were asked to perform a short improvisation; directly after the recording, with informed consent, each member was interviewed separately to avoid group members modifying their responses towards agreement (Barbour, 2005). As well as stand-alone questions, interviewees provided a commentary on a video playback of their group's improvisation (see supplementary file A). This 'think aloud' approach (Fonteyn, Kuipers, & Grobe, 1993) was intended to produce comparable versions of specific events, and is common to other investigations of improvising (cf. Bastien & Hostager, 1988; Doffman, 2011; Sawyer & DeZutter, 2009; Schober & Spiro, 2014).

Five trios were initially recruited in the United Kingdom with a further trio recruited among attendees at an international improvisation festival in Europe. In order to avoid bringing together musicians who saw their practice as incompatible but ensure that recruitment went beyond the researchers' immediate network, six participants were identified through personal contacts in the UK's improvised music scene, and each was asked to recruit two others to form a trio. Participants were all to be adults active in free improvised music-making; variation was sought in the sample in terms of musical or artistic aesthetics. Since free improvisation does not assign particular roles to players of particular instruments, it was seen as more important to observe individuals who were at ease improvising with each other than to maximise variation in instrumentation. This resulted in both heterogeneous and homogeneous groups, from a trio comprising analogue synthesizer, found object and violin to two trios all consisting of vocal improvisers, depending who the key contacts had enlisted

to join them. Available details of the improvisers and the musical backgrounds they supplied for themselves in their interviews are given in Table 1.

Table 1. Participant details

Trio	Participant	Gender	Instrument	Self-identified background
1	A	M	Bowed object	Classical electronic music
	B	F	Violin	Classical musician
	C	M	Synthesiser	Bands and DJing
2	A	M	Amplified objects	Improviser
	B	M	Amplified objects	Rock band/visual artist
	C	M	Electric guitar	Bands
3	A	F	Voice	Visual artist/choirs
	B	F	Voice	Visual artist/choirs
	C	M	Voice	Bands
4	A	M	Voice	Visual arts/theatre/choirs
	B	F	Voice	Visual artist/choirs
	C	F	Voice	Visual artist
5	A	M	Alto saxophone	Classical musician
	B	M	Electric guitar	Jazz musician
	C	M	Electric guitar	Classical musician
6	A	F	Piano	Classical musician
	B	M	Clarinet	Classical musician
	C	M	Cello	Classical musician

Six of the participants were previously known to the researcher who conducted the interviews. Within each trio participants were, given the nature of

recruitment, acquainted with one another; in each case, it emerged that two of the three individuals were treated as having collaborated more extensively than either had with the third player. This was possibly an artefact of the research design and was not foreseen during recruitment (although trios were specified, the participants otherwise played in ensembles with differently sized lineups). Nevertheless it was treated as a significant factor by the interviewees, and as such is reported on in the Results section below.

Short performances of each trio (4-9 minutes) were video and audio recorded in separate sessions by author 1 within an academic music department, while one was recorded in a performance space at the improvisation festival. Participants did not discuss their improvisation with each other at any point until after they had been interviewed. Audio examples can be accessed at [INSERT LINK: removed to conceal author identity].

During the interviews, replay of their improvisation was broken into 20-second sections, allowing participants at each stage to explain what they understood to be communicated by their own and other improvisers' contributions (see attached guide). As well as coding for themes following the grounded theory approach (Henwood & Pidgeon, 2004), interview transcripts were coded according to which section of the improvisation was being discussed, to allow detailed cross-referencing of different individuals' accounts of specific shared musical events. Analysis proceeded from consideration of individual accounts, to comparing those within trios, to a comparison across trios. To assure quality in the analysis, both researchers read the transcripts repeatedly and discussed the

emergent coding at each of these stages to resolve any inconsistencies in understanding. Discourse analysis (Potter, 2004) was applied to key exchanges within the data to consider whether and how the details of different accounts of an event supported a social constructionist explanation of improvising. Specific attention was paid throughout this process to instances that either researcher recognized as inconsistent with an emergent theme; descriptions and coding were discussed and refined as necessary to take account of such instances (Madill, Jordan, & Shirley, 2000; McGrath & Johnson, 2004). Member checking is also a recommended strategy in qualitative research (Lincoln & Guba, 1985); participants were given access to their sound files and an earlier report, and findings were discussed by a panel including the researchers and two of the participants.

Results

Options available to musical improvisers within free improvisation have been broadly categorized as: initiating an idea, maintaining what was already in play, or responding to another's contribution (Wilson & MacDonald, 2015). The interview schedule (supplementary file A) invited participants to describe not only what musical option they were exercising at given point, but also what options they judged others to have been exercising. For each section of each recorded improvisation, the accounts of all three participants were compared to consider how they explained their own and each other's choices. The findings reported here are organized under six key themes that emerged:

- *Convergence* presents analysis of musical events assessed similarly across

interviews, whereby the improvisers separately gave consistent accounts of the choices of each person in their trio

- *Divergence* presents analysis of musical events assessed dissimilarly across interviews, whereby accounts of the choices of each person in their trio differed markedly from one improviser to another
- *Expectations of others* describes how interviewees ascribed particular characteristics to other trio members, or anticipated particular tastes or musical acts on their behalf, on the basis of shared prior experience
- *Establishing trust* considers assertions of trust between improvisers as an important basis for interaction
- *Familiarity and shared practice* describes instances where one person's interpretation of trio interaction drew on shared experience claimed with other trio members
- *Confounded expectations and social construction* examines how interviewees accounted for another improviser acting inconsistently with their expectations of that person.
- *Individual perceptions of shared understanding* examines instances of interviewees asserting shared understanding between trio members in relation to particular events in the improvisation

Convergence in trio members' accounts

Among all trios, members' accounts were more closely aligned for some sections than for others. For instance, trio 2 made the following separate assessments of their piece at the start of the second minute:

We're making sounds but we're maybe looking for ways for the sounds to interact with each other. (2A)

We're still being quite cautious at the moment... I think we're weighing up very much what we're doing, and being quite careful about our playing. (2B)

It was still quiet early on I suppose, I didn't really know what folk were doing ... I mean I'm still kind of doing the same thing I was doing sort of at the very beginning, just scraping strings, stuff like that. Just might be quite a good point to start from. (2C)

Here, each individual positions all three improvisers as taking the same option, to continue the sounds they were producing; and for similar reasons of uncertainty, in that each describes the trio waiting for the ongoing pattern of sounds to suggest a route for development. Convergence tended to be around periods of relative stasis where participants described their ensemble 'treading water' in this way until a clear direction emerged, but was also apparent around some events within less static passages. Members of trio 6, for instance, showed synchrony in their understanding of a musical event in the fourth minute of their improvisation:

It was like proposing something new and they took this. Like I put some energy in and they took this energy and they started to... because when I play this rhythm they are not continuing this, eh, *al niente*. (6A)

That [change] happened with, that was 6A [*sings in imitation of piano*

contribution] and we just reacted on that... [*Interviewer: Why do you think 6A chose to go in that direction?*] 6B: I don't know, just maybe she felt like there has to be some energetic happenings. She felt like this, I think, yeah. I mean the part before had a long soft part and the piano actually was a bit too soft for the whole group. (6B)

I think for the first time 6A made some accent, made some movement with strong notes, some *fortissimo* or something like that. And she actually decided to let us know that we should react somehow on this. And 6B reacted also with some... I played some [*singing*] some strange destroyed noise, noisy sounds, and also 6B played ... something like that on the clarinet. (6C)

Each improviser identifies that, at this point, player A initiated vigorous playing as a departure from the music that had immediately preceded it, and that the other two change what they were playing in response to her initiative (from '*al niente*' to 'noisy sounds'). This is regarded by all three as a deliberate intention on A's part ('she actually decided') that was received by B and C as a proposal to change or move on, arising from a dissatisfaction with the level of energy in the piece. At other times, understandings of what was taking place contrasted sharply. During trio 4's improvisation, for instance, an ongoing pattern was interpreted thus by each improviser:

I think that we've been communicating more in other points ... I think that was more like three different thoughts going on at once there. [4A]

Although they seem like very different sounds that each person is making I think each person is quite aware of the whole sound. So they're thinking about a palette or a whole picture. [4B]

... he's doing little lip noises, very small. And I notice I start doing them. 4B, I don't think is referring to [a previous piece] at all. She's doing tiny little crackling noises that I think she describes as being at the edge of her voice. [4C]

4A describes each individual improvising in isolation; 4B describes each person providing contrasting material towards a common vision, and 4C perceives herself adopting one of two divergent initiatives from 4A and 4B respectively.

Divergence in trio members' accounts

At other points, all members of a trio acknowledged an event or an apparent need for change, but gave varied reasons for this happening, or interpreted the choices of each player differently. Sometimes there would be two or three nominations for who had instigated a change, or conflicting attributions of who was responding to whom. For instance, at one point in the fourth minute of trio 1's improvisation, the sounds from all three stopped abruptly. They gave the following accounts of the same event:

I started that reasonably pronounced, sort of stab, and, which no one really went for. So I went immediately to the other end given that we'd just done two or three sort of short sharp sort of one, two call and response style of things then I guess I would've expected something else within that sort of time frame and in a similar sort of dynamic level ... I didn't want to let another long void of silence kind of open up, 'cause it felt like we had some energy at that point and things were moving... [1A]

I decided that it was time to do something different. It's like, made this, the gesture,

you know, it's a very short one, which is not what we did before, and I think that's what changed the pace, the sort of direction there. We had a bit more silence ... what I did created some space, it stopped this sort of continuous thing happening. And that space allowed 1C to come in with something different. [1B]

I think he [1A] did a bow and banged the box and then you can see my hand completely immediately come off ... I'm listening for that kind of movement, so when I hear that then I'm, you know, I take my hands off as soon as I can in order to coordinate. And maybe that acts as a cue for other people too that something's happened... [1C]

1A and 1B each position themselves as deliberately trying to initiate a change in direction with a pronounced 'stab' or 'gesture'. 1B states that this achieved her intention of 'creating some space' in that the others follow her lead and stop playing, then describes 1C responding to this with a new sound. 1A on the other hand anticipated that his gesture would invite similar sounds in rapid succession stating that he intended to avoid a 'void of silence', but felt that 'no-one really went for' (responded to) his initiative. Yet 1C does understand himself to be responding to 1A's bowed stab, 'coordinating' by adopting his abrupt stop rather than 1B's; and suggests that his own hiatus acted as a cue to the others for silence. The group thus displays varied understandings of this short silence, in terms of: who had initiated it; who had responded to it; and why each player had acted in the way they did. In particular, the difference between a supportive response and the initiation of a new idea could be a matter of interpretation. For example, 2C described his actions at one point as a responsive accompaniment to what 2A and 2B were doing:

2C: ... I thought if they were gonna be doing quite a lot of scratching and stuff like that I should maybe try and just sort of like uh play like sort of stuff every now and again. Things like that, and leave space to hear what is building. Sort of sticking in some more dynamic stuff every now and then.

2A nevertheless interpreted the same instance as a new direction being introduced to the improvisation by 2C:

2A: Well 2C seemed to kind of launch into a solo and he was cutting the volume in and out.

All trios provided both convergent and divergent accounts of different points in their improvisations; therefore, although there were differences between the ensembles in terms of background, gender, and instrumentation, all were capable of displaying divergent understanding. It is clear from these data that groups of improvisers can operate under divergent understandings of the same improvisatory moments whatever their experience as improvisers. Furthermore, accounts can diverge at points where the improvisation is developing or changing, when the music might be expected to be of greatest interest or value.

Expectations of other improvisers

Analysis explored what might have led members of a trio to arrive at different understandings of the musical events they had shared. Social interaction was stressed as important to the life of ensembles in various ways. For instance, a member of trio 3 who had founded an ensemble with some of the other

participants stated of its origins that:

They all seem to like coming, really, and seem quite keen to come back ... And we kind of realized it kind of ticks a lot of boxes in people's heads as something to do, some kind of hobby, some kind of social gathering. [3C]

Consistent with this, interviewees' explanations of their musical behavior were explicitly informed by the social context, in that they all described expectations of their immediate collaborators. These could be based on experience of social interaction or conversation with that person:

I know 5C likes quite dissonance harmony so I tried to reflect that as well. I've often talked to him about using clustered seconds, like flat seconds ... I'd throw a few of those in there at points of the improv as well because I know that it would complement what he does in general. [5B]

In the example above, 5B describes tailoring his choices during the improvisation to emphasize musical features that he expects his fellow guitarist to appreciate, on the basis of what has been said on previous occasions. Expectations of others could also be formed on the basis of previous experience of specifically musical interaction:

I knew that 2B would pick up on it straightaway 'cause he and I have played together like two or three hundred times or something. [2A]

2A expects that certain of his own actions will immediately elicit a particular response from 2B due to a substantial shared playing history. Familiarity between improvisers also shaped musical interaction in that interviewees positioned a range of practices or strategies as recognizable and accessible to those who had shared them in the past, and thus as a basis for communication. These tropes conferred a particular agency. It was suggested that elements of previous interaction could be fielded within an improvisation as an option for the group to convene around, or could be recognized in each other's playing as a resource for interpretation; such options would not be accessible to someone without the same memories. One participant, for instance, commented on their improvisation thus:

I knew what they were doing, some of the noises that they were making were similar to what we had done before, so I think we were possibly all conscious of drawing from that work ... And some of that came up all the way through it. So obviously we weren't directed, but I was picking up on things that other people were doing and remembering. [3B]

Establishing trust

Expectations arising and shared social experience were in some cases strongly linked to the importance of establishing trust among those improvising together. Even in trio 3, where the members had worked together on only one previous project, or trio 5 which represented a new configuration, it was important to those involved that others in the trio could be seen as 'one of us'. The vocalists in trios 3 and 4 in particular underlined that trust between members was vital to their practice, since the highly embodied nature of vocal improvisation raised the stakes

in performance:

If you felt you were getting laughed at or folk felt you were ridiculous you probably wouldn't keep coming. Because if you're going to work on things that are kind of out your comfort zone you're trying not to improvise with stuff you know you're very good at ... But I guess you just resolve a certain group of people that do want to do this sort of stuff... If you had anybody that was scathing or sarcastic about what other people were doing it would crush it a bit. [4C]

In the interviews with improvisers who were affiliated to music education institutions, either professionally or as students, familiarity and shared social experience were seen as important in improvising together, but were less explicitly tied to the importance of establishing trust between group members. Nevertheless, these data indicate that participants' understandings of their improvised interaction, as presented to the researcher, are integrally shaped by how they understand other improvisers based on prior social and musical experience together, and by knowledge they assume will be common among the group.

Familiarity and shared practice

Being able to form expectations of others in the trio was generally seen to facilitate improvising together, while unfamiliarity was used to account for difficulties in interacting or comprehending. As stated in the Methods section, two of the three individuals within each trio were positioned as enjoying a closer improvising relationship to each other than existed between themselves and the third player, based on experience:

I mean 2B and I are 35 and we've known each other since we were like 17 years

old, so we know each other pretty well ... 2C, he's the wild card in this situation, where you said you wanted trios ... [2A]

When interviewed, this 'wild card' in each trio tended to defer to the other two as having 'steered' the improvisation, citing less experience of improvising with the them than they had with each other. The two more familiar improvisers, in their turn, described having to interact at a more conscious level with a fellow improviser with whom they were less familiar. More effort was involved since they felt less certain of what that person might play or intend:

With 5B I find it has to be more explicit as interaction, and then it's still equally as fun. But I think it's purely because I play with 5C a lot and we're quite used to knowing "It doesn't sound like we're there but we are." I think it's just a level of comfort, in a way. [5A]

Familiarity and shared experience were presented as having let the interviewees not only predict what another might play, but also understand why. They attributed decisions to other members of the group rather than suggesting they were acting musically on the basis of sound alone, and in doing so claimed understanding of that person's taste.

And I was surprised what he was playing, that I remember, it was like a folk tune or something... But I was not very confused because I have listened to some music of his recordings, and I know that he likes these things, and he knows that I like them too. [6B]

In the example above, 6B constructs 6C, on the basis of his familiarity with him, as

someone who would not only appreciate folk tunes but expect the same in 6B.

However, not all actions were reasoned in the interviews. Sometimes interviewees stated that they could not intuit why another person had made a decision, but could only observe the music they played:

R: Yeah. Whose decision was it to move to silence, do you think?

1B: I don't, I don't think, it's not clear to me, certainly it wasn't at the time and it's still not clear to me that it was one person's decision in particular.

Confounded expectations and social construction

Expectations could be confounded; in some cases, interviewees described surprise at what someone had played or sung as being 'uncharacteristic'. It was also stressed that it would be undesirable for improvisers' expectations of each other to make their interaction completely foreseeable. A lack of shared understanding was seen by at least one participant as invaluable to the music they sought to create:

I think if we thought we all knew what we were thinking that it would almost be pointless continuing. If we knew each other too well it would be too predictable. I find it very difficult to put thoughts in their heads. [4A]

Disparities between what was expected and what took place could be anticipated as creating tension for improvisers. It required them to be flexible in their interpretation of the musical environment as they proceeded. One participant highlighted this essential ambiguity of non-verbal creative collaboration in real time as the reason why it was crucial to be able to trust those around him:

If 4B starts the rhythm and then I join in with the rhythm then I feel in some way

that I'm supporting her. If I then try and introduce a different element into it and she keeps that rhythm going there's a chance that she's meaning "no, listen, this is the rhythm" but there's also the chance that "ah, that's working, let's stick with it." So in that sense I never know which way that's going: whether they're being supportive when they change or when they stick or whatever. It's kind of a trust thing. (4A)

In this participant's account, the process of improvisation is achieved partly through accessing, based on previous experience, a version of their collaborators that supported their mutual involvement in improvisation, even if that individual construction could not be objectively verified. Interviewees thus attributed motives to their co-improvisers, inferring what other members of the trio were thinking or intending in relation to the music. For instance, 3B said of one point in her trio's improvisation:

And what we were doing there, it was different because again it was quite staccato but it was to do with the energy and the sound level that something comes together and you can tell that they're playing off it too, that they're enjoying it as well, even if I'm the only one with my eyes open, I can tell. [3B]

3B positions it as objectively recognizable that the others in her trio are as enjoying a shared experience of a particular staccato texture and level of sound ("you can tell they're playing off it too"). Qualifying this with the use of 'even' acknowledges the possibility that this interpretation might be questioned, given that no verbal or eye contact took place; the passage ends with an assertion of the veracity of her subjective experience ('I can tell', rather than 'you'). She constructs her fellow improvisers in a way that allows her to make positive sense of the music in which

she is immersed. This can be regarded as a construction rather than as shared understanding in that, as in other instances, one individual asserted that reference had been made to a particular trope familiar to all three, but the others did not mention this in their accounts of the same event. It could of course be that the others chose not to mention this, or simply did not focus on it as important in their interview. The emphatic statement “I can tell” highlights that actual consensus may be less important to an individual improviser than a belief that they understand the intent of their collaborators.

Individual perceptions of shared understanding

Some accounts were clearly inconsistent between interviews. For instance, two members of trio 3 associated quite different imagery with the same moment in their improvisation, one imagining an ‘urban environment’ and the other perceiving ‘organic sounds of wind and water’. In the example below, different interviewees within a trio describe a particular passage in the second minute of their improvisation as involving reference to a previous piece their ensemble had devised and rehearsed. They assert that all three had been improvising with this reference in mind, yet at least two previous works are invoked:

Some of these sounds come from a single piece, ...[**piece X**], the glacial part of those kind of windy, whistly noises with very delicate hums... These ones go together. We’ve put these together before. Yeah, we kind of know where we are as a group under those conditions, at least for a short time. [4A]

Whistling, generally, with the choir is like an outdoor, cold windy sound. That is from a score, so I think that’s moved into the pattern of ... a familiar palette, yeah. [4B]

Ah, I know they're thinking they're referring back to this [**piece Y**] stuff because noises like that are all these little radio noises... It sort of gives us this vocabulary of things that we are drawing back on. But, yeah, that bit's definitely, I can tell where that's from... So those other two have just instantly turned on the noises of that particular piece which is the first piece we did. But if I had been with other people, you know, 3A was also in another group, she didn't do that so she wouldn't have responded in the same way. [4C]

Whistling sounds are being interpreted as evocative of glaciers by two participants, and of radio noises by the third. While piece X and piece Y may have involved similar sounds, different members of the trio expressed confidence in a common understanding based on pattern of sound familiar to all those involved. Even if those understandings were individually constructed within the social context of the music rather than shared, perceiving rationality in relation to others' contributions in relation to previous interaction with the other trio members of the trio allowed an individual to make contingent sense of the emergent group sound, and so to rationalize their own participation in the common endeavor.

Discussion

Summary

By taking account of the broader nature of contemporary creative practice, this qualitative research has given a novel insight into the social processes underpinning a unique psychological activity, that of group improvisation. Comparing different trio members' accounts of events during recorded free improvisations indicated that their understandings of who did what and why converged at some points, notably during relative stasis, and diverged at others.

Familiarity between improvisers could be seen as helpful in building trust within dynamic and highly uncertain musical contexts, and in allowing a less conscious approach to interaction. The interviewees described anticipating and interpreting musical behaviors of their collaborators with reference to previous shared social or musical experience; they considered nevertheless that such expectations could, and to some extent should, be confounded. In their interviews, improvisers individually assumed that their group shared certain tastes and asserted that others in the trio were referring to, or recognizing, certain musical material from their history in common. Comparison of their accounts where they diverged indicated that these ideas of shared tastes and practices could best be considered as constructions within this particular social context, not necessarily consistent across the ensemble but facilitating individual participation in the collective creative endeavor.

Convergence was observed around broad perceived tensions such as the need to vary or sustain ongoing activity, and tended to coincide with sustained or repetitive sounds being maintained, suggesting that it may be inversely associated with rate of change in improvisation. The fact that interviewees invoked shared history between some, or all, of the group to explain their interaction suggests a basis for convergence in familiarity and shared experience. Unless one wakes up on stage in mid-improvisation, the people one improvises with are never *complete* strangers; saxophonist and prolific free improviser Evan Parker has observed that features of uniquely shared practice between free improvisers (which he labels 'tropes') will increasingly recur the longer their collaboration is maintained (Saunders, 2009). Within free improvisation that seeks to be non-idiomatic (Bailey, 1993), such acquired practices might function in lieu of the stylistic constraints prescribed by Johnson-Laird (2002), whereby music can be spontaneously

generated more efficiently from recognizable components. Although improvisations can emerge between thoroughly unfamiliar players, research focused on such a scenario (e.g., Schober & Spiro, 2014) excludes a significant component of improvisation as it is practiced: interactions may build through sustained interpersonal engagement and evaluation over periods of years or even decades (Canonne & Garnier, 2011). Development of shared understandings through repeated nonverbal interaction would be consistent with the evolution of language observed in groups through gestural or graphic improvisation (Fay, Garrod, & Roberts, 2008; Garrod, Fay, Rogers, Walker, & Swoboda, 2010) and the shared mental models argued to coordinate socially improvised activity in team sports (Eccles & Tenenbaum, 2004; Reimer et al., 2006). Canonne and Aucouturier (2015) have recently found closer mental models of improvising among free improvisers with more playing experience together than among those with less.

Nevertheless, members of the improvising trios in the present study could also present distinct or contradictory ideas of each other's roles and intentions around the same event, even at times when individuals expected the group would be thinking coherently. Such instances of divergence run counter to the idea of shared mental models, observed among improvisers by Canonne and Aucouturier (2015); it is worth noting that the latter's findings were based on ratings of existing sound clips of another improviser rather than their own live improvising. In fact, it could be questioned why shared understanding should be an expectation in group improvising, or an indicator of success or prowess. Unlike team sports or conversation, in group musical improvisation it is not apparent that the more participants know what to expect of each other, the *better* the outcome will be; more polished perhaps, but not necessarily more rewarding. An exact

understanding of each other's intent might not be expected to facilitate the innovation characteristic of free post-idiomatic improvisation (Bryan- Kinns, 2013); some interviewees' concern at the idea of successfully predicting each other's every musical action underlines that in this aesthetic context, uniqueness and novelty are prized (Linson, Dobbyn, & Laney, 2012; Sawyer & DeZutter, 2009). Group improvisers can more usefully be understood to fluctuate within a spectrum of understanding from the relatively shared, such as when waiting for a new direction to emerge, to the individualistic, such as the decision to offer a new and unforeseen initiative (Schober & Spiro, 2014). Maintaining a constant sense of the piece that one is part of, and adjusting one's vision as it unfolds in unexpected directions or dimensions, is consistent with the physical changes observed in improvisers at points of structural change in work by Bryan-Kinns and colleagues (2013). We argue that divergent understandings create a mixture of uncertainty and certainty in a constructed social context that is essential to realizing the dynamic system of an exciting free improvisation.

Musicians accounting for their ability to improvise sometimes adopt a repertoire¹ of mystery, positioning it as an instinctive and unfathomable act in contrast to an explanation based on mastery of technique (Wilson & MacDonald, 2005, 2012). Rather than being seen as failures of communication, misunderstandings and cross-purposes within an improvisation could be considered engines of mystery, generating innovation through inherent uncertainty. From this perspective,

¹ 'Repertoire' is used as a term in discourse literature to denote a consistent pattern of description employed by a speaker to position themselves or others as a particular type of person: 'a lexicon or register of terms and metaphors drawn upon to characterize and evaluate actions and events' (Potter & Wetherell, 1994, p138).

divergent constructions within a group fulfill a similar function to the strategy of indeterminacy employed by composers such as Cage and Wolff (Lewis, 2002), but arise unplanned within a dynamic system of moment-by-moment construction rather than being prescribed by a composer. For this reason, shared mental models in relation to *existing* improvised music (Canonne & Aucouturier 2015) may be important for regular collaborators to establish. Even if, at a given moment, two improvisers cannot reliably predict each other's intentions and contributions to an improvisation, the conviction that fellow improvisers think the same way may allow each one to navigate the complexities of dynamic distributed creativity in real time. Choosing to respond to someone else's contribution within a group improvisation narrows one's options, ameliorating the cognitive demands of persistent innovation (Wilson & MacDonald, 2015); for the response is to be executed timeously, accessing a workable construction of that person is vital.

This model of collaborative or distributed creativity is consistent with social constructionist theory (Nightingale & Cromby, 1999). Individuals within an improvising group act according to their constructions of the others: for instance, as someone who appreciates dissonance or will recognise a particular piece of music. They modify their behavior depending on how well the assumption of shared understanding supports their involvement; if the other person's responses to dissonant material are not as expected, construction of that individual must be modified. Our evidence suggests that the constructions are flexibly applied to make sense of the immediate context, and may change as expectations are confounded.

Some limitations of the study should be recognized. None of the improvisers considered these improvisations exceptional by their own standards, some

pointing to the artifice of the research setting or to feeling under scrutiny while improvising together. The time-delimited nature of the task was invoked as a reason for improvising more busily than they might have otherwise, or as something that imposed a smaller scale on their structural approach. However, free improvisation by its nature is not music with a normative performance structure or milieu. Although particular contextual features that might have influenced what was recorded, free improvisations will always be influenced by context and therefore context-specific; and before leaving the recording studio, participants confirmed that the recording achieved was an adequate representation of how they might improvise in other contexts. Objectives in such a complex setting are nebulous and dynamic and may not be consistently held within a group anyway (cf. Rouse, Cannon-Bowers, & Salas, 1992). Improvisation in other forms of music may require less attention to social processes and the identity of collaborating musicians, since what they are likely to play is less uncertain. Yet even within a fairly mainstream and prescriptive form of improvising, the jazz standard, understandings have been found to diverge between co-improvisers (Schober & Spiro, 2014). While interviews took place as soon as possible after the recording, some participants such as 6A reflected that viewing the improvisation in retrospect made apparent some aspects of the piece that they had not been aware of while improvising.

Members of each trio, being acquainted, are likely to have observed etiquette by seeking not to seem critical of each other, even though they were assured of the confidentiality of their responses. [Author1]'s status as an improviser himself and as a psychological researcher may have led to particular demand characteristics shaping responses, if participants sought to meet particular musical or research

objectives they attributed to him (Orne, 1962). However, the researchers' subjective status in relation to free improvisation can also be viewed as a resource, giving them a close insight particularly suited to developing theory grounded in free improvising musicians' experience. Other researchers less close to the world of free improvisation might extend the understanding emerging from this analysis with further research exploring their own subjective relationship to the practice. None of the interviewees made specific attributions on the basis of their own or another's gender. However, differing approaches or understandings of interaction in free improvisation based on gender may be a valuable avenue for future research. Finally, quality of analysis in this study was maintained by rigorous crosschecking between the two researchers with negative case analysis to check for internal coherence (McGrath & Johnson, 2004), and findings were discussed with some participants. These methods were favored over less widely employed options involving a third party such as independent analyses or auditing (Akkerman, Admiraal, Brekelmans, & Oost, 2008), which introduce other essentially subjective perspectives and involve some assumption of an objective 'truth' discoverable in the data (Madill et al., 2000; McConnell-Henry, Chapman, & Francis, 2011). The approach taken nevertheless allows the analysis to meet requirements of enabling understanding and productive actions (Madill et al., 2000) and recognises the primary responsibility for interpretation as lying with the researchers (Turner & Coen, 2008).

Existing literature has called for further research into whether and how shared understanding might operate differently in genres other than jazz; with different musical goals; between improvisers who are known to each other; and where improvisers are co-present in a 'live' playing situation (Schober & Spiro, 2014).

This study has provided initial evidence towards all of these objectives that underlines that group free improvisation must be understood as more than individuals pitching ideas in and waiting for a response, and that ‘understanding’ in the context of musical improvisation is a complex and protean concept, given the breadth of artistic practice and objectives. Further exploration is needed into how construction of communication facilitates participation within group improvising. Within psychological research, this study is innovative in its systematic comparison of their separate accounts of a shared free improvisation by more than two people. When people improvise together they are not simply deploying skills and knowledge in ways commensurate with the sound they hear around them, but anticipating and reacting to *people* with whom they are making music (Schober & Spiro, 2014). Group improvisation must be viewed as a social field of practice and not solely a musical behavior to achieve a satisfactory explanation of all its forms.

The contribution of this study to psychological literature rests in part on taking into account the diversity of contemporary improvised performance practice, and these findings can be enriched or informed by similar studies of improvisation in other musical contexts. It would be valuable to extend the understanding of collaborative creative practice emerging here to generative social behaviors in other non-verbal contexts such as team sports, improvised dance (Torrents Martín, Ric, & Hristovski, 2015), the interaction of young children (Sowden, Clements, Redlich, & Lewis, 2015), or music therapy for communication difficulties. Our findings highlight that the dyad, more commonly investigated in this literature, is not enough to consider how improvisation works overall. Issues may multiply the bigger the ensemble: for instance, at what group size might separate sub-groups start to emerge in terms of musical goals? There is considerable scope for research

into how shared or constructed understandings of improvisation are affected by ensemble size, as well as by age or musical background. Asking ensembles to discuss and reconcile their separate understandings of an improvisation in a group interview would also add to these findings, accessing social norms to be compared with the individual versions observed here.

Given our findings of the influence of a common history on improvising together, and recent findings by Canonne and Aucoturier (2015), research is also needed to explore how sharing of musical values and the extent or nature of previous interaction influence group improvisation; how sustained shared experience may impact upon convergence; and indeed whether improvisers see this as a good or bad thing. Research to date has been limited to consideration of improvisations at a single point in time, and it seems likely that investigation of how improvisation practices or tropes develop between improvisers over time would advance our understanding of this uniquely exciting creative behavior.

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Additional file: interview guide

Recording

Thank participants

Explain study procedure, purpose & data handling; check consent

Record two 5-minute free improvisations without discussion; select one as main focus

Proceed to interview improvisers one at a time in a separate space; ask remaining two improvisers to wait in separate spaces.

Interview

Intro

- Can you describe for me what you do as a musician/artist? As an improviser?
- What do you aim to achieve when you're improvising in a group?
- How do your musical aims and views compare with the others in the trio?
- How does your instrument define your contribution to the group?
- What makes a good improvisation? And a bad?
- Overall, what did you think of the piece/s you just played [prompt: why?]

Replay the video of one performance in roughly 20-second bursts, allowing the interviewee to rewind or replay as they wish. For each section use questions as appropriate such as:

- Can you talk me through what took place there?
- What were you thinking during that? What was it about the music or the other improvisers that made you think that?
- What were the other players thinking/intending? How do you deduce that?
- How did what you played relate to what Y or Z did?
- What else might have happened there? What choice were you making
- Why did you/other player choose to play x? [or, choose not to play?]
- Where did that come from? How were you able to think of that?
- Was that good? Not so good? Why is that?

At the end: recap on answers; check consistency of understanding with participant

If time: replay the other improvisation, inviting the participant to stop at any point and comment on the interaction in this piece, and how it reflects or contrast with the first.

Ask for overall feedback.

Invite to comment on what it has been like taking part in this, or to ask any questions, add comments.

Thank participant.

Carry out remaining two interviews as above.