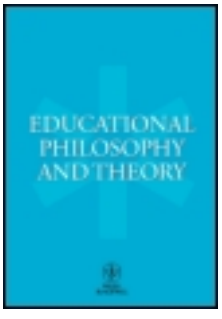

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To Think or Not To Think: The apparent paradox of expert skill in music performance

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Abstract

Expert skill in music performance involves an apparent paradox. On stage, expert musicians are required accurately to retrieve information that has been encoded over hours of practice. Yet they must also remain open to the demands of the ever-changing situational contingencies with which they are faced during performance. To further explore this apparent paradox and the way in which it is negotiated by expert musicians, this article profiles theories presented by Roger Chaffin, Hubert Dreyfus and Tony and Helga Noice. For Chaffin, expert skill in music performance relies solely upon overarching mental representations, while, for Dreyfus, such representations are needed only by novices, while experts rely on a more embodied form of coping. Between Chaffin and Dreyfus sit the Noices, who argue that both overarching cognitive structures and embodied processes underlie expert skill. We then present the Applying Intelligence to the Reflexes (AIR) approach——a differently nuanced model of expert skill aligned with the integrative spirit of the Noices' research. The AIR approach suggests that musicians negotiate the apparent paradox of expert skill via a mindedness that allows flexibility of attention during music performance. We offer data from recent doctoral research conducted by the first author of this article to demonstrate at a practical level the usefulness of the AIR approach when attempting to understand the complexities of expert skill in music performance.

Keywords: expertise, music performance, skill, mindedness, chunking, attention

Introduction

> It's like a state of hyperawareness but also not awareness. You have to be on a level where you're not thinking but you are aware. You can't be thinking about it, you just have to be it. (Al)

> If you think about the actual onstage part [of performance] it'll diminish it. (Brendan)

> You never know what's going to happen onstage. You don't know if you're going to bust a string … if the PA will suddenly blow up, if your piano player will be so hungover that she has to leave the stage to throw up or if a drunk from the crowd is going to wander up on stage and dance with you. That's all happened to me before. You just don't know what's going to happen. (Emily)

Taken from research conducted by the first author of this article,[1] these three quotations together illustrate an apparent paradox involved in the experience of skill utilization during expert music performance: to think or not to think? Implicit yet never addressed in the relatively small amount of extant research that has favoured the music performer as subject over the music listener, this paradox centres on the way in which expert musicians such as Al and Brendan experience the accurate recall and execution of encoded material in the face of having to handle the guaranteed uncertainties——as articulated by Emily——of live music performance.

Live performance requires an expert musician to recall a thoroughly learned piece of music with a high amount of accuracy in the charged setting of a performance venue. Initiated by the pioneering research conducted by Rubin-Rabson (1940a, 1940b, 1941a, 1941b, 1941c, 1941d), memorization processes practised by expert musicians have since been found to share similarities with memorization processes used by experts in other areas (Bartlett, 1996). Drawing on Ericsson and Kintsch's (1995) theory of long-term working memory (LTWM), Lehmann (1997) suggests that expert musicians' performance skills draw on the same highly detailed and context-specific mental representations underlying expert performance in other domains. According to Phillips (1977), the more skilled a musician, the larger the amount of information able to be chunked within these representations. In a similar vein, Williamon (2002) posits that musicians develop analytical strategies to assist in understanding the structure of unfamiliar music; these then become integrated into the early stages of learning with the view to creating superordinate cognitive structures that will help with effective retrieval of memorized material at a later stage.

Yet not only must an expert musician recall encoded material accurately, it must be done in such a way as to allow for the unknown and unpredictable variables that inevitably arise during performance to be handled effectively. Retrieval of previously encoded material must facilitate, rather than preclude, an expert musician's openness to the freshness of expression in a particular moment, playing to *this* audience in *this* state in a way that harnesses what Howat (1995, p. 19) describes as the 'lightning intuition that releases a performance into living sound'. Sloboda (1982) posits that the overarching cognitive structures underpinning expert musicians' accurate retrieval of previously encoded material——while detailed, hierarchical and consolidated during rehearsal——must also be open to modification via auditory and visual feedback received during performance. Yet is it really possible for expert musicians to modify these overarching structures in the face of the ever-changing situational contingencies

experienced during performance? If so, to what extent are such structures modifiable and how do expert musicians go about making such modifications?

The crux of the 'to think or not to think' apparent paradox lies in music performance involving the execution of skills that have been consolidated over hours of practice *and* that are open to specificity, to interpretation and to a working dynamicism that is ostensibly incompatible with rote learning. The purposes of this article, then, are three-fold: to explore the way in which past research can be applied to an understanding of expert skill in music performance, to profile a new model of expert skill in music performance, and to demonstrate how this model best resolves the apparent paradox contained within expert musicians' reports of their experience of skill execution during performance.

First, past research carried out by Roger Chaffin (Chaffin, Imreh, & Crawford, 2002), Hubert Dreyfus (2002), and Tony and Helga Noice (Noice & Noice, 1997c) is profiled. Although Dreyfus and the Noices do not work within the area of music performance, in this article we attempt to apply their accounts of expert skill to this domain. Viewed through the lens of the theories of Chaffin and Dreyfus, expert skill in music performance is seen as predominantly hinging on one particular element. Although this research is therefore limited in the extent to which it can be used to resolve the 'to think or not to think' apparent paradox, it also demarcates a particularly useful spectrum along which to place viewpoints regarding expert skill in music performance. At one end of the spectrum, and in keeping with views espoused by Lehmann (1997), Phillips (1977) and Williamon (2002), Chaffin emphasizes the key role that the following of an overarching, declarative, cognitive roadmap plays in expert skill in music performance. Dreyfus, at the other end of the spectrum, proposes that only novices need all-encompassing cognitive structures to facilitate the recall of skill; experts are so well experienced in their chosen area that their actions are guided solely by an embodied sense of what feels right in a certain circumstance. Closer to the middle of this spectrum and aligning with Sloboda's (1982) viewpoint, the work of the Noices is then examined. They argue that overarching cognitive structures *and* embodied processes consolidated during the learning process necessarily underlie the expert skill demonstrated by professional actors.

Secondly, a differently nuanced model of expert skill——the Applying Intelligence to the Reflexes (AIR) approach——is presented. Sketched by Geeves, Christensen, Sutton, and McIlwain (2008) and expanded by Sutton, McIlwain, Christensen, and Geeves (2011), the AIR model seeks to occupy an intermediate position between the highly cognitive, top–down model of expert skill advocated by Chaffin and colleagues and the 'skill as mindless reaction' position adopted by Dreyfus. In doing so, the AIR model is closest in spirit to the Noices' approach and aims to preserve the explanatory strength of Chaffin's and Dreyfus's positions while remaining broad enough to avoid inheriting their limitations. The AIR model proposes that expert skill in music performance (and in other domains) relies on a mindedness that facilitates the dynamic flexibility of attention, allowing it to be allocated freely and in a way that best meets contingent contextual demands. Essentially, the AIR model posits that:

> Certain patterns of behaviour which might appear stably chunked, automated, and thus inflexible are in skilled performance already and continually open [such that] … Experts have opened their 'reflexes' up into acquired adaptive patterns … dynamic repertoires of potential action sequences which can be accessed, redeployed, and transformed appropriately. (Sutton et al., 2011, p. 96)

After outlining the AIR model, select data are presented from recent doctoral research conducted by the first author of this article that investigated professional musicians' experience of performance. These data provide practical, real-life examples of the apparent paradox under discussion while illustrating how it is best resolved by the AIR model—a model that, consequently, deepens an understanding of expert skill in music performance.

Roger Chaffin: Expert Skill as Following a Declarative Mental Roadmap

Roger Chaffin's largest body of research concentrates on expert memory in music performance and was mainly conducted with Gabriella Imreh, a classically trained professional pianist. Chaffin et al. (2002) provide the most comprehensive statement of Chaffin's research programme with Imreh in their book *Practicing perfection: Piano performance as expert memory*, and other aspects of this work have been thoroughly developed in many other publications (Chaffin & Imreh, 1997, 2001, 2002a, 2002b; Chaffin, 2002, 2007; Chaffin, Imreh, Lemieux, & Chen, 2003; Chaffin, Lemieux, & Chen, 2004; Chaffin & Logan, 2006).

In his work with Imreh, Chaffin set out to explore whether the three principles of chunking, organization and practice (CHOP) shown to govern expert memory in domains relying substantially on declarative (conceptual) memory (Ericsson & Kintsch, 1995) could apply to expert memory in musical performance, which relies also on motor and auditory memory (Chaffin & Imreh, 2002b). Chaffin, Imreh and Crawford (2002) hypothesized that a musical novice would encode a piece of music purely at the level of motor (procedural) and auditory memory, whereas a musical expert would construct a more detailed overarching cognitive plan of the piece of music at the level of declarative (conceptual) memory.

Chaffin draws the majority of his data from his analysis of video and audio recordings made of Imreh's practice sessions over a 10-month period as she learned the third movement of Bach's *Italian concerto* (Presto) to performance standard. Combining qualitative and quantitative techniques to analyse these recordings, Chaffin linked self-reported declarative with performative data, thus providing a unique window into the internal processes that Imreh used when encoding cues for practice and performance.

From his work with Imreh, Chaffin concluded that Western Art music possesses an inherent hierarchical structure that is ready made for use as a retrieval scheme by an expert musician. At the top of the hierarchy are structural cues, with music being divided into movements that can be further divided into sections, subsections and bars. Next in the hierarchy are performance cues, conceptualized by Chaffin as a

subset of features that the musician purposefully selects from all the expressive (musical feelings to be conveyed), interpretive (phrasing, dynamics, tempo, pedalling) and basic (fingering, technical difficulties, familiar patterns of notes) features of a piece. In line with the features from which they are derived, Chaffin names and divides these into a top–down hierarchy of expressive, interpretive and then basic performance cues. Performance cues are seen to function as 'features of music that the musician thinks about during performance' (Chaffin et al., 2004, p. 727), and which 'give the musician conscious control of highly practiced motor sequences which would, otherwise, be entirely automatic' (Chaffin & Crawford, 2007, p. 158). Lower in the hierarchy than performance cues are the interpretive and basic features of a piece and lowest in the hierarchy are the individual notes in a piece of music (Chaffin et al., 2002).

According to Chaffin, the ways in which the CHOP principles of expert memory research characterize expert musicians' memorization processes are exemplified in his work with Imreh. He argues that Imreh, like any expert musician, can be seen to chunk new information according to pre-existing structures such as chords, scales and arpeggios, organize this information according to the hierarchy inherent in the musical structure of the piece, and then practise repeatedly to ensure the speedy and efficient retrieval of this information from long-term memory (LTM). For Chaffin, this process is made possible by the encoding of performance cues which function as both facilitators and remnants of the CHOP process and allow rapid and controlled access to LTM. This then permits LTM to play a live role in working memory: a process Ericsson and Kintsch (1995) label LTWM.

Chaffin and colleagues offer a highly cognitive, top–down model of expert skill in music performance that is wedded to an innovative, but particular take on Ericsson and Kintsch's (1995) model of LTWM. Their collaborative work with Imreh provides a rich source of both qualitative and quantitative evidence in support of the way in which a musician learns material well enough to reproduce it accurately in performance. However, their theory does not explain so easily how this encoded material remains open to the ever-changing contingencies and unpredictable demands of performance. Chaffin does not shy away from acknowledging the importance of flexibility in performance. Referring to Russian pianist Emil Gilels' quotation about the consistently changing ideas of a music performer, Chaffin writes 'Flexibility is a general characteristic of skilled musical performance as it is of other motor skills … [and] is necessary to adapt to the idiosyncrasies of each instrument, hall, and audience, to provide a feeling of freshness and spontaneity, and to recover from the mistakes that are an inevitable aspect of any live performance' (Chaffin & Logan, 2006, p. 15). According to Chaffin, Imreh and Crawford (2002) performance flexibility is anchored in the construction of an overarching mental road map that is held in LTWM and signposted by performance cues which 'provide flexibility by allowing the performer to remain mindful of a memorized performance that has become automatic through extended practice … allow[ing] the musician to attend to some aspects of the performance while allowing others to be executed automatically'. Yet Chaffin is unclear about how exactly performance cues facilitate performance flexibility. Indeed, the static, automated nature of performance cues and the rigidity of the mental road map

they form would seem to present a challenge to a performer who is attempting to adapt to the idiosyncrasies of performance and imbue it with the freshness and spontaneity that Chaffin believes to be so important. Chaffin's work makes a valuable contribution to what is known about the role of top–down processes in expert skill in music performance. Yet by placing such emphasis on this particular element of music performance, a more thorough explanation of performance flexibility is overlooked.

Hubert Dreyfus: Expert Skill as Embodied

While Chaffin posits expert skill as subsumed under a detailed, overarching cognitive framework constructed and consolidated over the course of many hours of practice, for Dreyfus (2002) such an intricate, top–down governing structure is only needed by a novice and dissolves as skill levels increase. According to Dreyfus, the more skilled a practitioner, the more intuitive and embodied her skill becomes and the less need she has for mental representations of her actions. As such, a true expert is free to 'simply' respond to a situation without needing to be guided by reliance on higher order, cognitive representations of potential action. In line with Merleau-Ponty's notion of maximum grip, a Dreyfusian expert is seen as responding flexibly to contextual contingencies on account of an embodied autopilot attuned to that which *feels* right——attuned to the 'body's tendency to respond to these solicitations in such a way as to bring the current situation closer to the agent's sense of an optimal gestalt' (Dreyfus, 2002, p. 1).

Dreyfus (2002) outlines five stages through which he believes skills become refined. Crucially, advancement through the stages——the transition from novice to expert——involves the shedding of preordained rules to firm up an increasingly sensitive embodied awareness of the most effective way of responding to unpredictable situational demands. Dreyfus's (2002) notion of expert skill and, by extension, performance flexibility is characterized by a certain mind*less*ness. In his words, 'mindedness is the enemy of embodied coping' (Dreyfus, 2007b, p. 353) because 'there is no place in the phenomenology of fully absorbed coping for mindfulness … there are only attractive and repulsive forces drawing appropriate activity out of an active body' (Dreyfus, 2007a, p. 374). Experience is seen to sculpt reactions to situations in ways too subtle to be expressed as rules or consolidated at the level of a cognitive framework, such that 'acting is experienced as a steady flow of skilful activity in response to one's sense of the situation' (Dreyfus, 2002, p. 8).

In direct contrast to that which Chaffin proposes in relation to expert skill, Dreyfus believes that an expert's optimal responding to a situation does not rely on a mental representation but is, rather, sensed by the body as something with which it needs to become aligned and establish equilibrium. Dreyfus views this type of knowledge as neither conscious nor unconscious but as operating on a non-conscious, automatic plane. Yet, as the work of Chaffin demonstrates, expert skill in music performance involves processes more complex than mindless smooth coping alone. While Dreyfus's theory helps to shed an understanding on the way in which an expert musician may flexibly respond to the freshness of a performance moment, it does not make much sense of or try to explain how expert musicians successfully retrieve such vast and

complex bodies of material. By placing heavy emphasis on the embodied coping involved in expert skill, Dreyfus overlooks planning, chunking and other crucial top–down processes involved in expert performance.

Tony and Helga Noice: Expert Skill as Reliant on Both Top–Down and Bottom–Up Processes

The Noices' work suggests that it is possible to integrate the opposing polarities represented by the work of Chaffin and Dreyfus in relation to expert skill in performance. The Noices are yet to generate a theory of expert skill outside their research domain of professional acting. However, the findings of their studies are still salient to the current discussion.[2] While this overview briefly maps the Noices' research trajectory over the past 20 years, they also co-author an array of highly recommended publications providing succinct and comprehensive summaries of their oeuvre (e.g. Noice & Noice, 1996a, 1997a, 1997c, 2002, 2006a, 2006b).

In their preliminary work, the Noices attempt to understand how it is that actors performing onstage retrieve large amounts of verbatim material (Noice, 1991, 1992, 1993). Their results support their hypothesis that, contrary to folk assumptions, professional actors achieve verbatim recall during performance by means deeper than rote learning. In further studies, the Noices suggest that these deeper abilities depend on two different yet concordant strategies that professional actors execute when learning lines: deep cognitive processing (labelled 'character analysis') and deep embodiment (labelled 'active experiencing').

Character analysis entails the microanalysis of a script by a professional actor in order to discern the goals and subgoals of his character. The Noices suggest that strategies naturally adopted within this microanalysis during role preparation——processes such as segmenting the script into smaller sections in accordance with the inferred goal-driven behaviour of a character (Noice & Noice, 1993) and attending to the context and internal characteristics of a character within a script (Noice & Noice, 1994)——inadvertently engage professional actors in problem-solving activities that overlap with mnemonic learning strategies (see Noice & Noice, 1996b, for an exploration of the similarities between memorization processes executed by professional actors and a professional mnemonist). The Noices argue that information comes to be stored in LTM on account of this unintended overlap, thus facilitating LTWM (Noice & Noice, 2006a).

Subsequent research demonstrates that character analysis is necessary but not sufficient for professional actors' high recall levels. Curiously, both novices and professional actors achieve better recall the more freely they are able to move while rehearsing material (Noice & Noice, 1997b, 2001, 2007). Professional actors also demonstrate higher levels of recall when they are instructed to speak lines during rehearsal as if they are aiming to achieve the goals of their character in real life (Noice & Noice, 1997d). On account of these findings, the Noices posit active experiencing——'living the material rather than just learning it' (Noice & Noice, 1997a, p. 495); a kind of playing the part of one's character 'for real' that involves 'the utilization of cognitive, motoric and emotive processes during encoding' (Noice, Noice, &

Kennedy, 2000, p. 362)——as an essential second element underlying professional actors' recall abilities.

The Noices' findings collapse the dichotomy constructed by the theories of expert skill proposed by Chaffin and Dreyfus. For the Noices, expert skill (or, at least, expert memory in professional acting performance) emerges from the crucial combination of top–down, overarching, cognitive hierarchical structures and bottom–up, embodied feeling and action. The work of the Noices serves to reiterate the broad nature of expert skill. It seems feasible to replace the either/or attitude adopted by researchers such as Chaffin and Dreyfus with a broader, more encompassing both/and approach in relation to cognitive frameworks and bodily feeling when attempting to sketch out a picture of the processes underlying expert skill. However, the extent to which the Noices' theory can be applied to music performance is not immediately clear.[3] Speculation is limited as, while expert musicians may have preparatory methods for performance analogous to the deep cognitive processing of expert actors' character analysis, they are generally not trying to embody a character or follow a script as explicitly as expert actors. The way in which expert musicians may actively experience the material they are trying to revivify on stage is similarly opaque. In sum, while containing the potential to bridge the polarities of the expert skill spectrum that the theories of Chaffin and Dreyfus encapsulate, more work is needed before the unifying potential of the Noices' framework is realized in relation to expert skill in music performance.

Applying Intelligence to the Reflexes: Expert Skill as Mindedness

Outlined by Geeves et al. (2008) and expanded by Sutton et al. (2011), the AIR model of expert skill embraces the spirit of work such as the Noices' that has challenged extant dichotomies created within theories of expert skill. Although we apply it here to expert music performance, AIR is a broad model of expert skill and is intended to be able to be applied across a wide variety of domains and musical genres.

Like Chaffin, the AIR approach conceptualizes skilled rehearsal and performative processes (both within and outside music performance) as articulable, accessible, stoppable, modifiable via learning and rechunkable. But we do not view this as being in complete tension with Dreyfus's phenomenology of everyday expertise. Dreyfus suggests that 'an expert's skill has become so much a part of him that he need be no more aware of it than he is of his own body' (cited in Sutton, 2007, p. 768). Knowledge processes underlying expertise may well be unconscious, but the AIR approach believes that they are accessible and articulable in the right conditions. Under such conditions, the suitability of the retrieval of particular performance-related information can be assessed relative to a given situation and this may then be followed by appropriate, on-the-fly modification. The AIR approach suggests that more room can be made for on-the-fly construction within Chaffin's general picture without having to adopt Dreyfus's view that such dynamic responding is above and beyond mental representation. The AIR framework also leaves more room than Chaffin's and Dreyfus's theories for the existence of individual differences between performers in how they manage to retrieve material accurately while maintaining performance flexibility.

Some performers may be more likely to rely on top–down processes, others on bottom–up processes, and still others on a dynamic interaction between the two.

Sloboda (1982) notes that the establishment of a hierarchical plan necessarily underpins expert skill in music performance but that this plan *must* be open to modification in order to give rise to the flexibility that is equally essential in expert music performance. In effect, this means that the wealth of information learned by an expert music performer must be encoded in a way that allows for it to be consistently chunked and rechunked under superordinate tags deemed most effective by a musician in meeting the demands of a given performance moment. The AIR approach proposes that expert skill in music performance is constituted by a dynamic responding that involves retrieval of the most effective (combination of) learned material given the unpredictable, contingent contextual demands with which a musician is faced during performance, and the integration with and expansion of this material in line with these demands. The AIR model posits that expert skill centres on *minded* thinking in which an expert's attention is freely allocatable to addressing whichever variables, at whatever level, present themselves as most important in a given moment. This, as opposed to attention being so automated that it becomes stuck to predetermined variables within a particular level of encoding.

This picture of *mindedness* in expert skill is midway between the fully prelearned conceptual LTWM position implied by Chaffin and the fully reactive Dreyfusian position. Unlike Chaffin and Dreyfus, the AIR model of expert skill places equal emphasis on providing an account of how a musician is able accurately to retrieve material during a particular performance moment *and* how a musician is able to remain open to meeting its particular, ever-changing demands. While aligning with the spirit of the Noices' work, the AIR approach can be applied more easily to music performance. On account of all of these factors, the AIR model offers a more comprehensive account than extant theory of the 'to think or not to think' apparent paradox that is prevalent in expert musicians' accounts of the execution of expert skill during performance.

A skilled music performer can chunk information around concepts that are either pre-existing or derived on the fly depending on variables such as genre, piece, audience uptake and strengths of the performer. These concepts can be(come) interlinked to form a musical road map and this interlinking (between cue and motor sequence, cue and cue) may be what is learned during practice as salient cues emerge and coalesce differently according to the presence of particular variables. Moving through this map occurs via reciprocal priming of cognitive cues from motor action (and emotional response to the music), priming further cues. Not all cues need to be in LTWM at the same time. Interlinked structures can (temporally, as the music flows and unfolds) flow through the performer, bringing into LTWM vast tracts of motor sequences and, in Chaffin's language, attached performance cues. Information rises into working memory and sinks out of it, but all cues are differentially more primed in LTWM and accessible (relative to, say, other musical pieces of the same genre which are known but have not been primed by recent practice and the anticipation of performance). In line with the integrative nature of the Noices' theory, the AIR approach views an expert musician's skill as contained within an overarching cognitive framework that is at once more

malleable and open to embodied, on-the-fly responding than Chaffin would suggest *and* more reliant on mental representations than Dreyfus would propose.

By way of analogy, if each encoded piece of performance-related information musicians draw on during performance were a Lego block, Chaffin would view music performance as relying upon these blocks being chunked into set formations over the course of rehearsal (Chaffin et al., 2002). For Chaffin, each set formation would represent either an expressive, an interpretive or a basic performance cue, and performance would then involve the musician moving from formation to formation in accordance with a prearranged route. Blocks may be able to be moved from one formation to another, but not without hard work and certainly not during performance.

The AIR approach envisions these Lego blocks as scattered around a musician who then interacts with them in a particular and identifiable way. Over the course of performance, certain blocks and certain configurations of blocks would appear to the musician as more appealing than others in meeting the particular demands with which he felt he was faced. The AIR approach views performance as resting on blocks being assembled and/or reassembled according to patterns of configuration preordained by an individual musician, group of musicians and/or performance tradition (such as Chaffin's performance cues: Chaffin et al., 2002) or according to patterns of configuration that emerge from the particular variables at play in a particular moment of a particular performance. Although the smooth operation of this process may make a music performer feel like a 'mindless' Dreyfusian expert, in reality the performer is mindfully engaging in both paying attention to the demands of a particular performance moment and the most efficient way in which to retrieve chunked material in order to effectively meet these demands.

Expert Skill in Music Performance in Action

A practical illustration of the 'to think or not to think' apparent paradox of expert skill in music performance and the usefulness of the AIR approach in attempting to further understand it——heretofore discussed through a theoretical lens——is found in data obtained from doctoral research carried out by the first author of this article. To form a grounded theory (Strauss & Corbin, 1998) of the experience of music performance for the professional musician, semi-structured interviews were conducted with ten professional musicians.[4] Intensive fieldwork was also conducted with a subset of four of these musicians on the two separate occasions that they toured a group performance in which they all featured, named the Wheel of Frank Confession Tour (WOFCT). While the gestalt experience of music performance was found to comprise multiple factors and their interaction (Geeves, 2012), the 'to think or not to think' apparent paradox of expert skill emerged as a dominant theme from an analysis of professional musicians' accounts of their experience of music performance.

The following examples demonstrate how the dynamic responding on which expert skill in music performance rests must be underpinned by equally dynamic chunking and retrieval practices. While Chaffin's theory has difficulty explaining the dynamism of such processes, Dreyfus's theory is reluctant to acknowledge their existence, and

the Noices' sketch of these processes and their dynamism is restricted to the domain of professional acting. Given these gaps, the AIR approach (Geeves et al., 2008; Sutton et al., 2011) is particularly useful when attempting to understand the processes that underlie expert skill in music performance——when attempting to understand the idiosyncratic ways in which musicians resolve the apparent paradox of recalling encoded material accurately and in a way that meets the demands of ever-changing and dynamic situational contingencies.

The Question of Thinking During Performance

Echoing Imreh's descriptions of her performance experience to Chaffin, musicians described how being cognizant of a variety of higher order factors in relation to performance was integral to its success. Luke articulated part of the mental checklist he ran through before a performance in order to prepare himself for it in a way in which he felt was adequate:

> I'll usually meet all the sound guys, do a sound check, suss out the vibe of the room. Is it indoors is it outdoors? If it's indoors late at night, how many people are there? Is it really dark and dingy? If it's outdoors, how many people are there? Is it really hot? Should I take a layer of a shirt off so I don't sweat as much? I can see how many people are going to be there right before the show so then in my mind I can figure out what kind of performance it's going to be.

Aligning with Chaffin's theory (Chaffin et al., 2002), an overarching mental framework was found to play a key role in musicians' execution of expert skill during performance. As in Luke's quotation, the framework under which particular information was chunked was found to guide musicians' effective retrieval and combination of encoded material during performance.

However, also bearing resemblance to Dreyfus's (2002) prototypical expert, musicians strongly advocated the value of 'not thinking' during performance. Al expressed this most succinctly when he stated:

> The main thing I try and do is get away from thinking about what I'm doing at the time. If you're onstage I think it has to be automatic and you have to be really in the moment.

Given the importance of a top–down, overarching mental framework in the execution of expert skill during music performance, to what were musicians referring when they described aspiring towards 'not thinking'? Ben described the links between musical proficiency and his experience of 'not thinking':

> You're not sitting there thinking about chord structure or tempo. That stuff should have been ingrained. There are far too many things going on in performance to make conscious decisions about every single one of them.

Kahne, the one classical musician in the study, described how maintaining an overarching view of what he hoped to achieve in performance helped him to remain aware of the large number of variables he was juggling during performance without becoming overwhelmed by them:

> I might have to look back at the music to double check that I'm doing what I'm supposed to be doing. Then, in my periphery, I need to look at the leader so that I'm in time. The conductor might also be setting us up and getting us ready so I need to keep an eye on that as well. Sometimes you end up having to focus on these four things and they can be in contradiction. If you comprehend the idea of what you're getting at, all of that stuff is not a problem.

For both these musicians, 'not thinking' involved the technical features of music performance becoming subordinated, regulated and orchestrated under a higher level chunk in LTWM that allowed them to freely allocate attention to where they felt it would best be put to use in meeting the situational performance demands with which they were faced. Bart articulated the freedom of attention during performance that musicians such as Ben and Kahne seemed to be experiencing when they referred to 'not thinking':

> You always have to be thinking and on your toes but you have to be free to think whatever you want. You can't be tethered to making sure the tempo is right or other minutiae. The less [sic] things that you have to think about, the more creative you can be.

'Not thinking' during performance seems best understood as a musician experiencing freedom during performance to divide or focus attention between or on various levels at which information has been chunked. Bart described how undesirable it was to feel forced to 'think' during performance——to experience having attention drawn towards and/or being unable to draw attention away form a particular level of chunking:

> Playing on a hire kit always poses a potential problem because it feels really alien … it's another thing you don't want to be thinking about. If you have to play on a kit where you can't adjust the tom up or down and so you've gotta play with it up here, you're thinking about that every time you go for it.

For Bart, it was not so much the level of chunking to which his attention remained fixed but the fact that his attention *had to remain fixed* to a particular level of chunking that impacted most negatively on his performance.

Negotiating the Apparent Paradox: Chunking 'Style'

Especially useful when attempting to understand how musicians might negotiate the apparent paradox of expert skill during music performance is the notion of chunking 'style'. Emerging from the doctoral research under discussion, chunking 'style' is best understood as the characteristic ways in which performance-related variables are

assembled and reassembled during performance. Encompassing both the *number* of performance-related variables that are free to vary and the *extent* to which these performance-related variables are free to vary for an individual musician or group of musicians during performance, chunking style effectively illustrates (in addition to being an operant mechanism within) the AIR model of expert skill. Chunking style can be characteristic of an individual musician, emerge from a group of musicians and/or result from the interaction between individual and group chunking styles. This, in turn, not only shapes the levels of chunking and extent to which a musician is able to move between them during performance but also influences how free to vary chunking style is between performances. We now briefly examine three different types of chunking style.

Individual Chunking Style

As something of a musical idiolect, chunking style directly influences the way in which a musician handles the apparent paradox of expert skill on account of its functioning as an almost dispositional framework around which a musician bases the handling of if–then contingencies during music performance. In this way, information deemed relevant by a musician to performance is chunked together in ways that then come to forge and distinguish individual performance style. In addition to varying between musicians, chunking style can vary across different performances for the same musician. Indeed, the extent to which a musician's chunking style is free to vary across different performances is one of its most defining characteristics.

Distinct individual chunking styles were particularly noticeable in the performances of Emma and Emily, two of the WOFCT musicians. Emily's chunking style was characterized by a flexibility that resulted in its being free to vary across performances. Emily described trusting herself in the handling of uncontrollable elements of performance. She acknowledged and accepted that that no performer could ever completely know what would occur on stage but that, regardless, performance must go on:

> It's about trusting yourself. Whatever I do is going to be fine because I'm doing it. It's my music and it's all part of the deal. You never know what's going to happen onstage. You don't know if you're going to bust a string, if the PA will blow up, if your piano player will be so hungover that she has to leave the stage to go and throw up … that's all happened to me before. All you can do is trust yourself and hope that in that moment your body knows what to do, your mind knows what to do, your voice knows what to do.

Rather than having to rely on a set, overarching performance structure, Emily trusted that she would know what to do in a given moment—that she had encoded performance-relevant information in such a way that the most appropriate information in its most appropriate configuration would present itself to her in a given moment. Emily's flexibility in chunking style is in marked contrast to that of Emma, whose live

performance comprised meticulously rehearsed and separable individual parts coming together according to a predetermined plan:

> Emma: My performance is very planned. I'll have the songs on a set list and the joining of the songs organised. Maybe I'll have some notes on my set list about what I'm going to talk about. I do like to have a planned show. My passion is the world where theatre and music meet—putting on a popular music show that's accessible but having this element of theatre. So it needs to be … not rigid because that sounds horrible, but set.
> Andrew: Right OK. So might you change the set list onstage?
> Emma: It is very rare that I would do that. It has happened, but it is very rare.

Emma expressed a much greater need than Emily to know before a performance what would happen on stage. As her chunking style was much less free to vary between performances, she relied more on rigid adherence to an overarching framework during performance than a musician like Emily.

Emergent Group Chunking Style

A chunking style can also emerge among a group of musicians. The dynamic interplay of individual chunking styles to form group-ness was particularly evident over the course of the work that was completed with the WOFCT musicians. Emily, Brendan and Emma inadvertently articulated one of the major parameters of the group chunking style that had emerged from their playing together in the WOFCT:

> Emily: We're trying to access emotions in the show. Normally I just use the music and that gets me into the emotion. But I feel like the objective of my work on the tour has been to try and work out how to quickly access [emotional] stuff so that it fits into the format of the show …
>
> Brendan: The wheel became a character that we had to react to.
> Emily: Yes!
> Emma: Yeah!
> Brendan: And we never even knew we were doing it.

Without consciously realizing it (but probably on account of listening to and trusting each other), the musicians came to collectively envision the wheel prop they used on stage as a character to which they had to react. In doing so, the group came to chunk emotion so that it could be conveyed to an audience in a way that both fitted the requirements of the WOFCT performance and was in keeping with the situational demands they faced collectively on stage.

Interaction Between Individual and Emergent Group Chunking Styles

The interaction of individual and emergent group chunking styles has the potential both positively and negatively to impact the way in which a musician executes expert skill during music performance. Bart described the adverse effect of feeling forced to

fall in line with an emergent group chunking style characterized by less technical proficiency than his individual chunking style:

> I might start off a song and I'll be playing the beat. The bass will come in but might be particularly loose that night or he hasn't warmed up properly and he's a bit behind the beat. So I'll just start dropping back and then the guitarist will come in and he's a bit in front of the beat. Minute differences in tempo will be going on and they're pushing and pulling the music and it just doesn't sit. So you start focusing on the tempo and you're running forward in your mind to the chorus. You're definitely not in the moment because you're worrying about a hundred other things. Your experience gets curtailed and you start intellectualising it. You're constantly regulating what you do as everything happens on top of you.

In contrast to Bart, Brendan described the extent to which he enjoyed giving himself over to the emerging WOFCT group chunking style:

> It's good to do this thing [WOFCT] because, last night, it really shook up my usual show. I couldn't choose what I was going to try and make the audience feel next. It was pointless to do that because the others might have done something totally different. But I felt like despite not knowing what songs we were going to do, it flowed really well. There's a weird little fifth element going on here. We had a good intuition going on between us. All the ideas about stepping back and becoming a unit are changing me as a solo artist now.

Importantly, the interaction between individual and emergent group chunking styles resulted in Brendan rechunking the way in which he viewed himself as a solo performer.

Conclusion

It is tempting to posit a single explanation (such as reliance on mental representations or embodied coping) to explain expert musicians' ability to reconcile the apparent paradox of accurately recalling encoded information in a way that meets ever-changing situational demands during performance. However, the evident complexity and dynamicism of expert skill in music performance require a more complex and dynamic explanation than that which can be offered by appealing to the theories of Chaffin or Dreyfus. Aligning with the unifying spirit of the Noices' research, the AIR approach posits expert skill in music performance as reliant on mindedness characterized by a flexibility in which information is chunked around either pre-existing or on-the-fly concepts according to a variety of variables. Freed from being stuck within or between a particular level of chunking, expert musicians are able to allocate attention——in line with an individual and/or emergent group chunking 'style' and/or their interaction——to recalling encoded material in a way that will best meet the varying demands with which they are presented in any given performance moment.

Notes

1. In this article, all musicians are referred to by their first names. See Geeves (2012) for further details about the musicians and this research.
2. Interestingly, the Noices have collaborated with Chaffin (Noice, Jeffrey, Noice, & Chaffin, 2008). However, it was decided to omit explicit discussion of this article from this section on account of the uncertainties by which it is characterized that are outlined in Geeves et al. (2008).
3. As Tribble (2005) notes, there are also difficulties adapting the Noices' account of expert memory to professional acting in earlier periods of history.
4. Musicians were drawn from a broad range of musical backgrounds and performance traditions/genres. Again, see Geeves (2012) for further detail.

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