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### **3.4 Performing music: Oral and improvising traditions**

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The practices of oral and improvised musical traditions impact the psychological demands of the act of performance, for both musicians and audience. This chapter discusses the diversity of performance contexts that exist across musical traditions, and the varying priorities and constraints these impose on cognitive work related to the performance of music. This concerns the acquisition of musical skills and how these are conceptualized; memorization (and of what sort); the prioritization of different aspects of musicianship; and the conventions of performance context that may implicate varying levels of skill from audiences, too, as part of a successful performance.

Keywords: musicianship; social interaction; audience; performance; ethnomusicology

#### **Introduction**

This chapter addresses the cognitive processes that are understood to underlie musical performance in oral and improvising traditions. In relation to music, the idea of an oral tradition refers broadly to musical practices whose means of transmission (of musical ideas and activities – including repertoires, performance conventions, techniques) do not rely on written or printed notation. Improvisation in music, meanwhile, broadly describes the material process and aesthetic consequence where musicians generate organized, meaningful sounds “in the course of performance” (Nettl & Russell, 1998). In the past, musical

improvisation has also been defined primarily through its relation to conventional, scored composition (Nettl, 2005, 2013). The title of the chapter thus encompasses a vast array of musical practices, essentially describing all types of performance which are not considered to be part of a highly literate tradition, namely those associated with classical Western art music.

Two bodies of literature in particular are relevant for the discussion of performance in the context of non-notated music. Firstly, there is a considerable body of psychological research on music performance; secondly, ethnomusicological research has investigated oral traditions and practices from around the world. Since the field of music psychology has largely – though not exclusively – offered explanations of cognitive processes behind perceptual phenomena which relate directly to Western classical art music, academic discourse on music cognition has been shaped to some extent by knowledge of the formal practices and theoretical concepts associated with this particular conception of music-making. Accordingly, the field has yielded substantial bodies of literature devoted to self-evidently exclusive topics, such as sight-reading, or the perception of Western classical tonality. An indirect consequence of this particular focus has been to influence the extent to which scientists have been able to conceptualize and investigate music as performance and social behavior. Thus, knowledge and understanding of music cognition in oral and improvising traditions requires the evidence and insight offered from the fields of ethnomusicology and sociology in order to balance the picture gleaned through psychological research methods. This has lately resulted in more attention to a wider range of musical traditions and situations; which in turn helps to inform the study of performance within the dominant Western art music tradition since performers in this tradition also rely on orally-learned, cultural knowledge to complete their interpretation of a notated score. For a fruitful discussion of performance processes in the context of oral

traditions, I will borrow from both psychological and anthropological perspectives in this chapter, seeking deliberately to synthesize evidence from distinct disciplinary traditions.

Psychological research into music performance has a core literature following some forty years of increasingly concerted scholarship. Readers unfamiliar with this literature can look to the reviews by Gabrielsson (2003); Palmer (1997, 2013); and the collection of chapters in the section on performance of the *Oxford Handbook of Music* (Hallam, Cross & Thaut, 2016), and *The Science and Psychology of Music Performance* (Parncutt & McPherson, 2002). These each provide their own overview of the topic, revealing the scale and multidimensionality of the scientific endeavor that it demands. They report empirical measurement of psychological tendencies and behavioral constraints in various aspects of musical performance-related tasks, such as sight-reading, memorization, performance planning, motor processes, and comparative measurements of expressive variation, focusing typically on sound production discrepancies within a repertoire or between performers (see also Fabian, this volume).

As noted earlier, however, oral and improvised performance is by no means the primary focus of this literature. For an introduction to the range of insights brought to the study of music cognition from ethnomusicological accounts of music performance – predominantly focusing on oral musical cultures – see Ramnarine (2009). Two further, key pieces of literature for the topic of cognition in oral music traditions include the most recent cross-cultural music perception review article by Stevens (2012), and Ashley's (2016) entry on the psychology of improvisation for *The Oxford Handbook of Music Psychology*. As Ashley notes (2016, p.669), a significant cognition and psychology literature now deals with musical improvisation – albeit with a bias towards Euro-American jazz, which is likely to skew the

field towards Western-centric research questions and explanations of performance. Described by Averill (2004) as a “Euro-American fetish for sophistication” (p. 97), this tendency continues to orient studies towards a limited canon of intellectualized musical forms, with a predominance of attention to Asian court musics and also to jazz. The chapter by Vuust and Kringelbach (this volume) deals exclusively with the psychology of musical improvisation, and reports on the most current developments in the field.

The concepts of orality and improvisation address different concerns, and yet these concepts are strongly associated. Music performance organized within oral traditions can involve varying degrees and sorts of extemporization. Our first task is then to consider the concept of orality a little more fully in order to understand its relationship with the notion of improvisation, before continuing with the main topic of this chapter. There, the focus will be on relating oral performance traditions conceived within varying socio-cultural contexts with extant music cognition research, whose focus is predominantly on notated music, exploring implications as well as discrepancies.

Oral (or, more precisely, oral-aural) musical tradition can be taken to describe specifically the perpetuation of specific cultural knowledge, combining both abstract forms and material practices. Such knowledge is learned and shared through processes of face-to-face communication, involving the activities of listening and memorizing through replication and repetition. In this way, oral-aural musical traditions are sustained through the participation of individuals and their memorization of particular musical compositions, forms and texts; and also through these individuals’ practice-based acquisition of multimodal music production and perception skills. Ethnomusicological literature describes how the conceptualization of oral music traditions may come about through prescriptive teaching and learning processes,

resulting in a systematic and thorough means of conservation of repertoire and style (Wade, 2004, p.17). Such transmission processes are generally understood to preserve musical works through a process of slow but constant change (Nettl 2005, p.297).

The formality and prescriptiveness of the transmission process, however, does not imply that all resulting performances will be acoustically equivalent. Thus, a particular song or tune may be learned aurally to a high level of acoustic verisimilitude – exactly the same notes, sung with the same words and pronunciation, in the same key, at the same tempo. Alternatively, the same song may be learned aurally but developed during the event of performance into a novel reworking: some aspect of its structure, such as its scale-form, text, harmonic organization, or melodic patterning may be treated as a point of departure for a never-to-be-repeated, improvised performance. Improvised performance, in this sense, is clearly differentiated from the performance of music that has been memorized either “by ear” – as in informal learning of popular music, for example – or learned “by heart” from notation, as is more typical for performances of classical Western art music. Differences between these forms of learning lead us to expect differences in the memorization procedures used, their cognitive representation and organization as units and structures, and in the choices made by performers when they must subsequently deploy known units and structures in the act of musical performance. (Of course, what dimensions of perceived musical structure happen to be considered as “the same” or “different” within a given musical system is a complex and culturally-differentiated matter. Musical scores tend to make a restricted array of musical features (e.g. harmonic structure, metric organization, narrative coherence) appear as definitive structures, whilst aspects such as timbre and groove, or cyclical forms – which may just as well be considered as the primary conceptual structures in a given musical system – are less apparent in notation. What is deemed to be a faithful and accurate rendition of a

particular item of repertoire within an oral tradition may in some cases involve an entirely new melodic line; or the “same song” may have brand new words. Nettl again: “No doubt, the particular view that a society has of change and the nature of music plays a greater role than any law of human behavior” (2005, p.297).)

In addressing music cognition of oral performing traditions, we will first consider variations in music’s roles and functions and the varying demands and expectations these impose on music performance, as well as variations in performance contexts. This is followed by more specific consideration of cognitive aspects of performance including memory, cognitive schemata and multimodality in performance; and finally, rhythm, meter and expressive timing – a topic discussed from a psychological perspective that has been strongly influenced from the outset by non-notated dimensions of music performance.

### **Sociocultural and sociomusical expectations of performers**

Ethnomusicologists and music sociologists have demonstrated the multiplicity of music’s social and personal functions. Clayton (2016) reports that music plays a part in many profound and vital social transactions, such as in ceremony and ritual, where musically organized behaviors may induce states of trance, possession, and ecstasy, which may be directly associated with healing or other fundamental matters of wellbeing. At the level of individual taste and preference, music is also implicated in the construction of a social-cultural identity, including differentiations in gender, age, ethnicity, and social history. At a wider, social level of organization, the adoption and adaptation of musical genres by globally dispersed communities may also contribute to the collective construction of cultural identity. When we imagine the infinite variations in musical performance functions in this broad

fashion, it becomes obvious that a musician is more than just a sound-maker. Musicians take on both social and creative roles, negotiating their actions with audiences and fellow musicians through events of performance. The goals, organization and criteria for success of a performance vary as a consequence.

To consider what constitutes a successful music performance, one might ask: on what grounds do we judge technical and aesthetic proficiency? Who judges it and how does this shape performance? We know that specialist training in musical performance is not essential for everyone, since profoundly affective musical experiences are available to so-called non-musicians who have not received specific musical training. Our focus on music as oral tradition offers particular insight into the world of pre- or non-expert performance.

Ethnomusicologist Jankowsky (2010) describes, for example, ritual healing events enacted by Stambeli musicians in Tunisia, which are deliberately structured in order to permit participation by non-musicians alongside the expert Stambeli. Or, one could consider the case of more routine, day-to-day music-making such as choir singing or singing along with music in the car. The criteria for “success” in a music performance must vary according to the time, place and function of performance, which an anthropological perspective evident in all forms: amateur and professional, popular and classical, formal and informal.

These varied sociocultural contexts of music-making draw attention to the multiple ways that participants within a musical culture acquire their skills, through both formal and informal means (Green, 2002; Smart & Green, this volume). Processes of enculturation into oral music traditions have been recorded through countless ethnomusicological research projects, but the topic has certainly not yet been exhausted by music psychologists. A recent example of a comparative anthropological approach is available in the “Growing into music” project,



whose output includes a 68-minute ethnographic film documenting musical enculturation across a number of oral traditions in West Africa, Cuba, Venezuela, North India, Rajasthan and Azerbaijan (Durán, Magriel & Baker, 2011). The impact of such an ambitious project has been, so far, to foster greater awareness of and interest in oral transmission in the countries featured in the study; such a corpus may yet be used as a resource for psychological enquiry into the acquisition of musical performance skills in the context of oral musical traditions.

Of course, the particularities in each case of musical enculturation present a methodological challenge to the design of psychological studies. However, when we seek out pragmatic commonalities in the attributes and knowledge which constitute musicianship across oral and literate cultures, human relationships and interactions lie at the heart of musical practice. In psychological research, the dimension of interpersonal interaction in joint performance has been explored through studies of co-ordination and synchrony among ensemble musicians (see Wöllner & Keller, this volume). Intuitively-designed studies have explored the relationship of “leader” to “follower”, picking up on the conventional role-based hierarchies that classical art music performance lends itself to. However, systematic investigation of detailed timing evidence has revealed that the achievement of musical synchrony is not as simple as this role-based account might suggest: counter to their designated roles, “leaders” consistently concede to the behavior of their “followers” in the course of musical performance. “Thus, adaptation to the timing of one’s partner in a musical ensemble seems to transcend influences of musical roles and any biomechanical differences” (Palmer, 2013, p.416). For any musical tradition which involves some degree of extemporization or deviation from a learned script, and more than one performer, communication skills including sensitivity to others’ actions and – crucially – the capacity to adapt one’s own behavior to

match these – are of utmost importance. In the next section, we will also see how certain performance contexts further promote a mutual relationship between performers, and between performers and their audiences.

### **Performance contexts and communication**

Performance context affects the organization of interpersonal interaction within a performance event, and therefore it is likely to impact on the psychological demands for performing musicians and audience alike. To illustrate the influence of performance context, consider, on the one hand, performers in purpose-built concert halls – or at a large music festival – who tend to be physically separated from their audience by the staging and architecture. They may also need to accommodate amplification equipment, or the conventions of orchestral ensemble configurations, so that their interactions with one another are physically limited – perhaps hindered further by the presence of music stands. Such events may still be abundantly interactive and engaging, but it is possible to imagine the material content of the performance transported from one venue to another with little change. At the other extreme, in one specific example, the case of Afro-Brazilian Congado offers an entirely different view. In this religious performance, the contextual and environmental dimensions are themselves drawn into play, since the *congadeiro* (musician) procession must shape the dynamics of their continuous, cyclical performance according to the demands and possibilities of each place or ritual (Lucas, 2013).

Ethnomusicological examples of secular music performance, too, describe the extent to which context and audience role may shape the outcome of the musical performance.

Describing his own experience as a performer of secular Arabic music, ethnomusicologist

Racy (1998) reports an occasion on which “the physical presence of a large group of individuals unable to respond idiomatically to my improvisation [felt like] a musical liability” (p.106). This sentiment is echoed by North Indian sitar maestro, Buddaditya Mukerjee: “The artist is there - he's the person responsible for creating the beauty, which is expected of him. But give him a chance! So for the first ten or fifteen minutes, it is the audience's most respectful duty to support the artist in whatever he's doing. If he can't grab the attention of the audience in those fifteen minutes initially, then they're free to talk or leave the place!” (Moran, 2007, p. 84). We can hear in these accounts a social conception of music, where the responsibility for what material emerges comes from the time and place of the performance, implicating the audience, too, as contributors.

At a pragmatic level, the way in which musicians and their audiences organize and orient themselves in relation to one another has received some attention in music psychology performance research, mainly via studies addressing matters of communication and interaction in the case of classical Western music interpretation. Such research reveals the range of negotiations made by singers and instrumentalists in the course of resolving pragmatic and aesthetic concerns, such as King and Ginsborg's (2011) investigation of gestures and glances by ensemble musicians, and Kawase's (2014) study of piano duos' use of mutual gaze to support their co-ordination. Researchers who have set out to explain the cognition behind performance structures in oral (particularly improvised) music also make reference to dimensions of interpersonal interaction, often drawing on analogies to speech-like or conversational episodes. Sloboda (1985, p.139), for example, compares the process of melodic improvisation to the verbal skills demonstrated in storytelling. Ashley (2016) later draws attention to the similarity between musical improvisation and conversational speech production, pointing out the need for musical improvisers to articulate their musical

utterances within the constraints of both larger-scale, discourse-like structures but also in tight temporal concert with other performers, although he adds that this is “unlike speech, where the norm is one speaker at a time” (Ashley 2016, p.668).

Following this analogy, it is worth noting the complexity of those social cues which permit coherent turn-taking and which facilitate a narrating speaker’s utterance production: face-to-face or conversational interaction depends on a strongly collaborative process. In fact, the attention of the listener is vital in face-to-face story-telling. Bavelas and colleagues (2002) asked experimental participants to tell informal “close-call” stories to a confederate. When the confederate listeners withheld their demonstration of attention by averting their gaze at key moments, the narrator’s stories were curtailed. Similar dependencies between actor and co-actor can be expected in musical interactions, such as between soloists and their accompanists or between two (improvising) soloists. Investigating the implicit support between performers, Moran, Hadley, Bader and Keller (2015) investigated the extent to which improvising musician duos appear as a coherent social “unit” to observers in an experimental study, using 10-second audio-visual stimuli depicting improviser instrumentalist duos as motion-captured point light displays. These stimuli – created from episodes of the recorded performances in which one musician improvised a solo whilst their partner instrumentalist was temporarily silent – simulated a conversation-like scenario within musical interaction. The results of the study indicated that the sample of sixty participants required no music training to distinguish free-improviser duos from manipulated stimuli, in which the soloist and listener were switched between different duos. Such evidence supports the view that musicians behave responsively to their partners on the level of social and musical behavioral cues. The implication is as well to suggest an elevated role for the

audience's role in music performance reception, since they may apparently draw on their general abilities of social perception to make pertinent musical judgements.

### **Structuring performance: the role of memory, cognitive schemata and multimodality**

Psychological research into music performance provides a picture of various interlinked cognitive systems (e.g. associative, schematic and procedural memory systems), which together account for the extraordinary and wide-ranging feats of memory demonstrated by performing musicians (Chaffin, Logan, & Begosh, 2008). In order to participate in “a community of musicians who share a common purpose, set of skills and musical vocabulary” (Ashley, 2016, p. 674), oral or improvising musicians must usually have learned a certain amount of content, such as a corpus of songs. Such repertoire knowledge is in this sense a cornerstone for stylistic development. Ethnomusicological texts such as the authoritative, ten-volume *Garland Encyclopedia of World Music* document repertoire as a matter of disciplinary routine. And yet, this is not a simple act of taxonomy: most such repertoires are neither transmitted nor acquired via cleanly indexed books like jazz real-books. Even in traditions where such commodities are available, the reality is far messier, as Faulkner and Becker's (2009) ethnography shrewdly reveals, referring to “the jazz repertoire” as “the mixture of jazz, popular songs, ethnic music, and whatever else ordinary musicians might learn through their experiences playing in public” (2009, p. 16).

Musical performance that takes place without recourse to either a sight-read or pre-learned script is of course characterized by skills of recall and reproduction: but also by fundamentally generative processes of sound production. Performers themselves must supply, at the point of performance, the ongoing material content (in other words, the music!).

Studies in the cognitive psychology of oral tradition and memory account for particular memorization and recall processes associated with song and chant (Rubin, 1997). For example, the cuing effect of rhythmic performance facilitates learning and recall through mechanisms to do with constraints imposed by the temporal position of items (e.g. word or melody-choice at a given moment,) and durational limits (e.g. long-short patterning). Repetition in the structure of songs and chants also aids memorization, particularly where this reinforces hierarchical and episodic organization (McLucas, 2011, pp.43-5). Sloboda (1985) argues that memory mechanisms in both oral and literate contexts share such processes in common, since both are based on “the ability to extract higher-order structure from sequences of notes. In an oral context, the musician uses a stored structure to generate different, but structurally linked, note sequences on different occasions” (p.246).

Sloboda's (1985) influential text on music cognition, *The Musical Mind*, proposed some key similarities and distinctions between specifically precomposed and improvised (namely, jazz) performance. With reference to *schemas* – our recognition of patterned information through representations held in long-term memory – Sloboda describes improvisation as a process in which “formal constraints...comprise a ‘blueprint’ for performance”, in place of a fully composed and revised musical score (1985, p.139). Ethnomusicologists typically urge a more circumspect consideration of the intersection between improvisation and pre-composition, emphasizing the relationship between the two concepts along a full spectrum of pre-scripted, to prompted, to (ostensibly) free-form musical forms. However, this model is consistent with a number of descriptive and empirical accounts of music performance. Nettl's (2005) analogy between Western serialist composition and Native American Peyote song, for example, compares the serialist composer's manipulation of materials according to explicit rules, and the performance of Peyote song, which involves “using and abiding by general structural

principles...musically making clear a number of intricate interrelationships, deriving new phrases from earlier ones, all within a rather rigidly defined framework” (2005, p.29).

In order to carry out such principles in live music performance, musicians are required to have at their fingertips a range of learned motor patterns. The design and execution of these sub-units of performance material reflects (and, by processes of feedback, informs) the performer’s own understanding of the musical organization that they are generating. In contrast to some Western classical music pedagogy where patterns are learned in connection to a highly literate theoretical system of harmonic interrelationships, music performance supported by a predominantly oral tradition is more likely to be learned through functional performance units. For example, it is common to hear students of classical music practicing major scales from tonic to tonic, which reinforces the key’s theoretical unity – but not its typical deployment in performance. In the case of our two best-documented improvisational genres, jazz musicians know the value of rehearsing complete *licks*, and North Indian sitarists work to perfect their *tans*; these are both examples of transposable melodic formula which are consciously overlearned in order that they serve as stock-phrases, allowing performers to “keep it going” during performance (Slawek, 1998). Berkowitz’s (2010) detailed account of learning to improvise at the keyboard within the classical Western tradition reports a similar process of internalizing through embodied memory particular cadence patterns, harmonic relationships and idiomatic melodic movements.

The way in which such knowledge is acquired is a key factor in determining the likely organization and subsequent usage of that knowledge. The degree to which traditions make use of a theoretical foundation varies, ranging from informal, implicit learning (linked to complete items of repertoire and therefore particular patterns), to an explicit theoretical basis

that allows for theoretical rather than intuitive generation of new material. Knowledge of repertoire and its underlying schemata does not need to be abstract or purely auditory. In contrast, it is likely to be intrinsically linked to motor expertise. All music-specialist performance skills rest on technical skills at producing and modulating sound, whether as extemporized or pre-learned material. The intentional control of an instrument of any sort (including the internally-housed apparatus used by singers) requires fine motor control, expert temporal co-ordination of independent movements between limbs or parts, and the assimilation of feedback between aural and motor processes at a very high temporal resolution. It is well known that expert performance of Western classical music requires “the precise execution of very fast and, in many instances, extremely complex physical movements that must be structured and coordinated with continuous auditory, visual, and somatosensory feedback” (Altenmüller & Furuya, 2016, p.529).

Performance of non-Western classical music at the expert level requires similarly skillful, multimodal and temporally integrated technical proficiencies, whether the performance is initiated and acted out according to the memorization of a precomposed work, or whether it is generated extemporaneously according to learned formal constraints. One of the most documented examples comes again from the study of North Indian classical music, a predominantly oral and highly formalized tradition. The acquisition of highly controlled motor patterns is of no less importance to the sitarist than to the violinist. North Indian classical musicians acquire their skills within a tradition which upholds punishingly high expectations of skillfulness and dexterity, achieved through rigorous over-learning of schematic patterns within overarching modal, rhythmic and melodic systems (Neuman, 1980). Similarly, following Berliner’s (1994) identification of “licks”, “crips” and “schemas”, Biasutti and Frezza (2009) emphasize how much value jazz musicians assign to consummate



mastery of idiomatic sound production. Ashley (2016) explains how such internalization of physical patterns and behaviors through dedicated hours of intentional practice and repetition leads to procedural (as opposed to declarative) knowledge, which is what seems to provide “a set of pre-existing materials which serve as a vocabulary or lexicon from which they [improvisers] can select and on which transformations can be effected” (p.670).

Based on his research into Afghan lute performance, and with the advantage of his own status as an expert performer, ethnomusicologist and psychologist, John Baily has argued that one of the most important conceptual models for improvised performance is “a spatial model in which movements are planned and experienced in visual, kinesthetic, and tactile terms” (Baily 1992, p.150). This introspectively-driven account emphasizes the role of motor pattern learning and feedback in the generative work of creating large-scale, coherent musical structures in the course of performance, which chimes with the personal report of many practicing musicians. Although the study of the relationship of motor systems to memory is not yet a mature field (Chaffin, Logan & Begosh, 2008, p.355), the multimodality of musical performance – its demand for simultaneous activity across, for example, auditory, motor, visual and emotional systems – is understood to provide great opportunity for learning and the creation of retrieval cues.

### **Rhythm, meter and expressive timing**

In performance, musicians make decisions that serve to emphasize what is salient according to their own estimation and comprehension of the underlying musical structures. Such expressive decisions may distinguish amateur from expert performers; their detection and reception by audience members can also separate the cultural outsiders from the insiders.

Conceived as a particular sub-domain of empirical performance research (Gabrielsson, 2003), *expressiveness* in performance research describes a topic staked out according to musicological efforts to explore the non-textual elements so apparent in music listening and performance but which are hidden in score-based study: the sum effect of nuances of phrasing, intonation and delivery which can distinguish one musical performance from another. Fabian, Timmers and Schubert (2014) provides a collection of chapters which present the music psychology community with the broadest consideration of this topic to date, including discussion of expressiveness in Estonian song and in Central African polyphony from the Cameroonian Bedzan community, as well as examples from popular, funk, jazz and Indian classical music. The chapters by Ashley (2014) and Bauer (2014) highlight particularly the importance of groove and microtiming as expressive features identified in popular and jazz music.

The study of groove and microtiming has accelerated as a consequence of the availability of high quality timing data from audio recordings. This area of research is extremely important for the study of oral music cultures: high quality recordings and, specifically, timing data provides an empirical alternative to the score, and a redistribution of the attention formerly focused on melodic transcription. An example of the insights to be gained from such a perspective comes from recent research on Mande drumming (Polak & London, 2014). The basic roles taken up by members of Mande drumming ensembles include a core metrical accompaniment, a performer who provides the characteristic “hook”, and an improvising and regulative lead drummer. Polak and London’s (2014) analysis reveals that performers show individual microtiming patterns, whilst the collective ensemble generates a non-isochronous metrical structure and continuous accelerando. Performers negotiate this structural acceleration, which means that successful ensemble playing in this context cannot rely on a

stable reference tempo, but one that is characterized by continuous directional change. Such long-term changes in tempo are central to various oral traditions, including Japanese Gagaku and Tibetan monastic music as described by Huron (2006).

## **Conclusions**

Even where music is routinely notated in some fashion, an individual musician or music student always acquires the practical skills of music-making orally, through their relationships with other people: in this sense, orality is a key component of every musical performance tradition. But the matter of notated versus non-notated music performance raises some issues for music psychology. Two important and related questions which have a particular bearing on music perception and cognition research are: Firstly, how do we determine which structural or formal components can be considered as fixed features, and are central to the perceived organization of musical phenomena? Secondly, how is such knowledge articulated and transmitted amongst its proponents? These are important considerations to take on board when interpreting evidence from scientific research, whose ultimate aim, of course, is not to document individual cases and distinctiveness but to find collective and generalizable underlying features. For reasons already discussed at length, not all topics reported in mainstream music psychology performance research have an obvious bearing on oral or improvised performance (for example, the psychology of sight-reading); and yet many issues (such as the nature and diversity of underlying musical schema, or the relationship of motor systems to musical perception and memorization) are clearly deserving of the increasing and comparative attention that they now receive.

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