

Doing things with music

Joel W. Krueger

© Springer Science+Business Media B.V. 2010

Abstract This paper is an exploration of how we do things with music—that is, the way that we use music as an “esthetic technology” to enact micro-practices of emotion regulation, communicative expression, identity construction, and interpersonal coordination that drive core aspects of our emotional and social existence. The main thesis is: from birth, music is directly perceived as an affordance-laden structure. Music, I argue, affords a sonic world, an exploratory space or “nested acoustic environment” that further affords possibilities for, among other things, (1) emotion regulation and (2) social coordination. When we do things with music, we are engaged in the work of creating and cultivating the self, as well as creating and cultivating a shared world that we inhabit with others. I develop this thesis by first introducing the notion of a “musical affordance”. Next, I look at how “emotional affordances” in music are exploited to construct and regulate emotions. I summon empirical research on neonate music therapy to argue that this is something we emerge from the womb knowing how to do. I then look at “social affordances” in music, arguing that joint attention to social affordances in music alters how music is both perceived and appropriated by joint attenders within social listening contexts. In support, I describe the experience of listening to and engaging with music in a live concert setting. Thinking of music as an affordance-laden structure thus reaffirms the crucial role that music plays in constructing and regulating emotional and social experiences in everyday life.

Keywords Music · Emotion · Enaction · Affordance · Intersubjectivity · Joint attention

J. W. Krueger (✉)

Danish National Research Foundation: Center for Subjectivity Research, University of Copenhagen,
Njalsgade 140-142, 2300 Copenhagen S, Denmark
e-mail: joelk@hum.ku.dk

Introduction

Music is everywhere.¹ And everywhere, people do things with music. We are active listeners. We determine how, where, and when we engage with music. Musical experience thus is not something that is done *to* us. To the contrary, across a range of contexts and forms of listening, musical experience is, rather, something we *do*. Music, and the process of doing things with music, is an integral part of everyday life. This paper is an exploration of how we do things with music—that is, the way that we use music as a tool or “esthetic technology” (DeNora 2000) to enact micro-practices of emotion regulation, communicative expression, identity construction, and interpersonal coordination that drive core aspects of our emotional and social existence. It is within these everyday contexts that we use music. They are the concrete loci where we discover active listeners creatively doing things with music.

The main thesis of the paper is this: from birth, music is directly perceived as an affordance-laden structure. In other terms, musical experience is fundamentally a temporally extended, exploratory activity: a perception, manipulation, and appropriation of different sonic affordances offered up by different pieces of music. Music, I will argue, affords a sonic world, an exploratory space or “nested acoustic environment” (Nonken 2008, p. 293) that further affords possibilities for, among other things, (1) emotion regulation and (2) social coordination. A consequence of this view is that music ought to be thought of as a tool that we appropriate and use to construct different forms of self-experience and social relatedness. When we do things with music, we are very often engaged in the work of creating and cultivating the self, as well as creating and cultivating a shared world that we inhabit with others. As active *perceivers*, we are in many ways perceptual *composers*. Music invites this kind of dynamic engagement.

In what follows, I develop this thesis by first introducing the notion of a “musical affordance”. Next, I look at how “emotional affordances” in music are exploited to construct and regulate emotions. I summon empirical research on neonate music therapy to argue that this is something we emerge from the womb knowing how to do. I then look at “social affordances” in music, arguing that joint attention to social affordances in music alters how music is both perceived and appropriated by joint attenders within social listening contexts. In support, I describe the experience of listening to and engaging with music in a live concert setting. Thinking of music as an affordance-laden structure thus reaffirms the crucial role that music plays in constructing and regulating emotional and social experiences in everyday life.

Why is this thesis philosophically interesting? First, it challenges some implicit assumptions behind a number of prominent philosophical and psychological treatments of musical experience. As Christopher Small notes, much work on

¹ I am grateful for constructive feedback on earlier versions of this paper provided by audiences in Copenhagen and Durham. Thomas Cochrane and Anders Thingmand Henriksen offered exceedingly valuable commentary on an earlier draft. Finally, I am very grateful for the critical feedback of two anonymous reviewers.

musical experience tacitly assumes that “the listener’s task is simply to contemplate the work, to try to understand it and respond to it, but that he or she has nothing to do to contribute to its meaning. That is the composer’s business” (Small 1998, p. 6). Psychologist John Sloboda calls this the “pharmaceutical model” of musical experience, which he says rests on the assumption that listeners “are the passive recipient of musical stimuli which have the psychological effect they do because of the way that the human brain is constructed, on the one hand, and the way that music is constructed, on the other” (Sloboda 2005, p. 319). But as I will work to show, this passive characterization of musical listening speaks only to a very narrow range of musical experiences. It does not accurately represent the most pervasive forms of our everyday listening. Nor does it capture, on a phenomenological level, the fundamentally interactive nature of musical experience. More often than not, music is a dynamic element within everyday contexts, a feature of these contexts that, in part, shapes both how these contexts are perceived by us as well as what we do in them, individually and collectively. In other words, I intend to challenge this “passive contemplation assumption” by looking at how listeners actually use music, in different ways and in different contexts, to actively construct different musical meanings.

Additionally, since music has a non-referential nature—unlike language, it lacks semanticity, at least in the way that language has this property—and since, moreover, it might appear that music does not seem to offer any immediate utility, many scientists (e.g., Pinker 1997) are content to view music and human musicality as a curious, but evolutionarily irrelevant, artifact (Trehub 2003, p. 669). Steven Pinker, for example, (in)famously calls music “auditory cheesecake”. According to Pinker, music is an esthetically pleasing bit of sensual stimulus without adaptive function, and therefore unnecessary for the cognitive and linguistic development of healthy human beings. He writes: “Compared with language, vision, social reasoning, and physical know-how, music could vanish from our species and the rest of our lifestyle would be virtually unchanged. Music appears to be a pure pleasure technology, a cocktail of recreational drugs that we ingest through the ear to stimulate a mass of pleasure circuits at once” (Pinker 1997, p. 528). I want to challenge this view and situate music and musicality directly within the current of everyday life, showing how it is a crucial tool for cultivating and regulating our emotional and social life.² Without music, our life—including our ability to sensitively relate to and communicate with others—would indeed change dramatically. The notion of a “musical affordance” will be central to showing how this is so. I turn to this notion now.

² One reviewer questioned the necessity of responding to such an obviously mistaken view as Pinker’s. While I do think that Pinker is quite wrong on this point (for reasons I develop below), it is not at all clear to me that everyone would agree. For example, the fact that music perception, as well as the relation between emotion and music, has only recently (i.e., within the past few decades) begun to receive considerable attention in psychology and neuroscience might be taken to suggest that other scientists have, at least until recently, implicitly shared this bias. Additionally, there is a benefit to spelling out as carefully as possible *why*, exactly, Pinker is mistaken on this point—even if many of us would already agree that he most certainly is.

Musical affordances

Since the term “affordance” is not commonly used in discussions of musical experience,³ I want to specify what I mean by “musical affordances”. The notion of an “affordance” was first introduced by the perceptual psychologist James J. Gibson (1966, 1979)—though as Gibson himself acknowledges, the idea predates his work (see e.g., Heft 2001). This is Gibson’s well-known original statement of the notion:

The *affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill. The verb to *afford* is found in the dictionary, but the noun *affordance* is not. I have made it up. I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment (Gibson 1979, p. 127).

According to Gibson, an affordance is a relational property of the animal’s environment perceived *by* that animal as having a functional significance *for* that animal. More simply, affordances are perceived as opportunities for goal-directed action. For instance, something can be perceived as being climbable, graspable, or having a surface or structure that can be walked on, sat on, hidden under, climbed over, picked up, or thrown. Crucially, however, affordances are only specified in relation to the activity-repertoire and skills unique to different animals. So, only an animal with a certain kind of anatomy and capacity for movement, for example, sees a doorknob as graspable and pullable, or a rope as climbable, or a desk as lean-on-able or hide-under-able. Conversely, an animal lacking this anatomy and motor capacity will not perceive these particular affordances (i.e., they will fail to develop sensitivity to them). But they may, in fact, encounter other affordances relative to their particular physiology and activity-repertoire. An animal’s sensitivity to different affordances is thus a function of both its biology as well as its developmental and experiential history.

Affordances are therefore not merely bits of perceptual information littered across the animal’s environment. Beyond this, affordances are “*action* consequences of encountering perceptual information in the world” (Clarke 2005, p. 38). They determine trajectories of possible engagement and practical outcomes of embodied interaction that are available to multiple affordance-detecting creatures. Importantly, the shared accessibility of affordances is what establishes the sociality of an animal’s material environment (Costall 1995). Affordances open up a shared world in which people can do things, including construct and coordinate their experiences both individually and collectively.

A point of contention in the literature concerns the ontological status of affordances. The debate is over whether affordances are best understood as properties of the animal (i.e., subjective and variable), the environment (i.e., objective and constant), or the animal–environment relation (i.e., somewhere in between). This is not a debate I intend to address here. For my purposes, I will simply assume that affordances are properties of the animal–environment (or

³ There are a few exceptions. See DeNora (2000) and Clarke (2005).

listener-music) relation.⁴ In other words, they are realized within the relation between a feature of the environment (e.g., particular structural qualities of a piece of music), on one hand, and a perceiver-side ability or skill (e.g., motor capacity, perceptual, and affective sensitivity) enabling the pickup and appropriation of this structural feature, on the other. The relevant perceiver-side skills are what make music affordances show up as available for engagement and appropriation. More specifically, they are what open up music as something to be explored and used, that is, as a structure available for engagement and appropriation. But musical affordances are simultaneously dependent upon qualities of the music, too—hence their relational (or *interactional*) nature.

So, a particular piece of music only affords different forms of engagement and appropriation if there is, in fact, a sensitive listener or collection of sensitive listeners to engage with and appropriate it—and, indeed, to *recognize* it as affording both engagement and appropriation in the first place. But at the same time, a particular piece of music has an auditory and compositional structure that, in virtue of its possessing certain invariant properties (explored below), can open up certain affordances for a sensitive listener relative to a particular activity-repertoire (or better, *listening-repertoire*) unique to that listener. Musical affordances thus emerge through the dynamic, temporally extended interaction between active listener and musical piece. They are realized within this relation. And when I speak of musical affordances, then, I have in mind the qualities of a piece of music that a sensitive listener both perceives and appropriates in the process of constructing and regulating different emotional experiences and in organizing different social contexts and interpersonal relations. Picking up musical affordances is what it means to speak of music as being experienced as something that we can do things with. But again, it is only experienced as such by listeners with the appropriate skills (e.g., perceptual and affective sensitivities).⁵ Now, I want to begin looking more carefully at how musical affordances enable us to do things with music.

⁴ Gibson, too, seems to hold this view. He writes that, “an affordance is neither an objective property nor a subjective property; or it is both if you like. An affordance cuts across the dichotomy of subjective–objective and helps us understand its inadequacy. It is equally a fact of the environment and a fact of behavior. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer” (Gibson 1979, p. 129). But this statement confuses as much as it clarifies; and it potentially contradicts the previous quote. For criticism of Gibson on this point, see Katz (1987) and Costall (1986). For an attempt to clarify Gibson’s view and offer an updated view of affordances as properties of animal–environment relations, see Chemero (2003) and Stoffregen (2003).

⁵ As we will see below, the requisite skills fall upon a continuum. Neonates and infants possess some of the basic perceptual and affective sensitivities needed to experience music as an affordance-laden structure. But the musical skills of a neonate are, of course, clearly impoverished compared to those of a musically experienced adult. Like any other skill, music perception can mature, becoming more polished and refined as our perceptual and affective sensitivities develop with age and experience. Additionally, as we age, our listening skills deepen and become more robust in that we become capable of making certain environmental (i.e., historical–cultural) associations with particular sorts of music or musical sounds. For instance, a particular song might trigger a flood of high-school memories for one listener but not the other (e.g., perhaps the second listener is younger, and only knows the song as a retro hit from years gone by). Or, the quality of a particular musical sound, such as the ferocious distortion present in many of Hendrix’s guitar solos, might summon vivid images of the free love 1960s, drug experimentation, and political activism for those who first heard these solos in their original historical context. But as the examples discussed throughout the paper will show, these associations need not be present for listeners to respond to music in an active and emotionally sensitive way. I am grateful to both anonymous referees for pressing this point albeit in somewhat different ways.

Doing things with music: emotion construction and regulation

Unlike the perception of other art forms such as viewing a painting or reading a poem, musical experience very often involves listening to the sounds comprising a piece of music in a way that abandons an explicit appreciation of their sources. Musical experience involves a consideration of the sounds on their own terms, that is, the sounds experienced as “detached from the circumstances of their production” (Hamilton 2007, p. 58). The fact that a particular sound is produced by a particular instrument or piece of software is not part of the content of this kind of esthetic experience. Nor is a consideration of the various acts that led to the sound’s production (e.g., a studio recording versus a live performance). What is experienced, rather, is the sound itself. It is experienced *transparently*.⁶

Of course, the worldly properties of a sound’s source (e.g., the particular wood that gives a violin its distinctive tone; the instantly recognizable strumming and spaciousness that marks Robin Guthrie’s unique guitar technique) *may* become part of the content of a particular experience of piece of music. Additionally, we might savor a particular piece of music for the various cultural and historical associations that are attached to it (e.g., religious music, protest songs, anthems co-opted by a sports team, or political group, etc.). This form of musical listening, however, which incorporates environmental details secondary to the sound themselves, requires a voluntary shift of attention. It involves a self-conscious broadening of the attentional structure of perception to incorporate both the sounds themselves as well as the instruments, acts, and events that are their sources (O’Callaghan 2009). But this is an atypical mode of listening, I want to suggest. For when we engage sensitively with a piece of music, when we listen to it as a source of emotional power and expressivity, we tend to listen to it transparently and immediately in the manner described above. We literally listen *into* the piece, I suggest, *directly into* its expressivity and emotional resonance. We immerse ourselves within the immediacy of its phenomenal riches, since this is where we encounter the piece’s emotional content (Davies 2001, p. 30). This sort of transparent listening is our most common everyday way of experiencing music. And this observation helps us to understand why music is universally revered, held by so many to be such a powerful and immediately accessible art form. As we will see below, this observation also helps to understand how and why music is readily perceived by sensitive listeners, including the very young, as furnishing possibilities for emotion construction and regulation.

⁶ This is a controversial point. Jerrold Levinson (2005), for instance, argues that appreciating some of the actions leading to the production of a particular musical sound (e.g., the abrupt arm motion preceding a cymbal’s crash or the gestural dynamics of playing the violin) is a major factor in shaping our appreciation of emotional qualities in music. And surely there are instances where listening in a neutral way may detract from a deeper appreciation of certain esthetic qualities in music. Our experience of listening to the music of a marching band or a song at a live rock concert, for instance, may be somewhat blunted without a simultaneous experiential awareness of the vivid actions and interpersonal coordination that produces that music. However, my point is simply that our normal way of listening to music—again, in a sensitive and attentive way, as I stipulate below—is to listen in a relatively transparent way. Moreover, given that young children and possibly even some nonhuman animal are capable of listening “deeply” and responding to expressive qualities in music without appreciating the actions or circumstances that led to the creation of the music, the transparency thesis seems relatively plausible. Thanks to Tom Cochrane and an anonymous reviewer for pressing me here.

To be clear, I am not suggesting that this kind of transparent listening necessitates that we always hear music in an abstract or formal way, as pure tones wholly divorced from their concrete instantiation or cultural and historical context. To the contrary, I suggest that, though we hear music transparently (i.e., as independent of a particular material source), we nonetheless immediately hear it as *something that can exert material efficacy in the world* (e.g., as an esthetic technology affording emotion regulation and social coordination). Again, we immediately hear music as something that we can do things with. To reiterate the point: whatever expressive power a piece has is commonly experienced independently of the sources of the sounds or the manner of their production. The sounds themselves, when organized in a particular way, are directly experienced as offering up a relatively self-contained sonic world, an aural landscape or virtual sonic space that affords engagement and appropriation without the simultaneous awareness or experience of the sounds' environmental significance.⁷

Music for babies

Thinking of music as a “sonic world” is helpful. It draws attention to the exploratory and interactive nature of music listening, as well as the “world-making” power of musical pieces. There are indications from various sources that music is experienced as a sonic world affording possibilities for emotion construction and regulation from birth. From the start, we seem to directly perceive music as a tool for creating, organizing, and regulating our experiences, as well as our relationship to the world and others. To explore this idea more carefully, I want to first look at some evidence from studies of neonate music therapy. Music therapy is a family of music-based techniques and practices that give patients of all ages the opportunity to explore and communicate a wide range of emotions (Bunt and Pavlicevic 2001, p. 181). While it initially emerged from work with children and adults suffering from various disabilities or mental health problems, much recent work within the past few decades has investigated the effects of music therapy on neonates.⁸

The neonate's entrance into the world is the culmination of a traumatic journey. Consider in particular premature and low-birthweight neonates born into intensive

⁷ So, I both agree and disagree with Roger Scruton on this point. In *The Aesthetics of Music*, Scruton writes that, “we spontaneously detach the sound from the circumstances of its production, and attend to it as it is in itself...The history of music illustrates the attempt to find a way of describing, notating, and therefore identifying sound, without specifying a cause to them” (Scruton 1997, pp. 2–3). I think this gets the phenomenology of our everyday music listening correct. However, Scruton continues later: “The person who listens to sounds, and hears them as music, is not seeking in them for information about their cause, or clues as to what is happening. On the contrary, he is hearing the sounds *apart* from the material world. They are detached in his perception, and understood in terms of their experienced order...” (Scruton 1997, p. 221). With these remarks, Scruton pushes the “transparency” thesis too far. As I will argue below, features of a musical piece heard as a sonic world are shaped by the environment in which the piece is experienced. In other terms, music listening is always *embedded*—and features of a piece's embeddedness within a particular music-listening episode play a role in shaping how the music is experienced by the listener, especially when other listeners are present. Thus, just because transparent listening involves hearing the music as divorced from the material circumstances of its *production*, it does not follow that we necessarily hear the music as divorced from the material world *as a whole*. More on this below. For some other objections to Scruton on this latter point, see Hamilton (2007).

⁸ The discussion that follows is very much indebted to DeNora (2000).

care units (ICU). While in the womb, the prenatal infant is enveloped by a stable and predictable sonic world, what F.M. Hicks colorfully calls a “uterine symphony”:

The sound that dominates the unborn child’s world is its mother’s heartbeat. Other voices and unfamiliar sounds add harmony to the already progressive composition of the uterine symphony. From the 24th week on, the unborn child listens all the time. He or she has lots to listen to, as the pregnant abdomen and uterus are very noisy places (Hicks 1992, p. 31).

As Tia DeNora (2000, p. 77) notes, the elements of this uterine symphony are many: the mother’s heartbeat; her voice as she speaks and sings to herself, to the infant, or to others; the sound of other voices, some of which are directed toward the infant; a host of internal intrauterine sounds, such as the “rhythmic “swooshing” of the blood as it rushes through the placental vessels” (Collins and Kuck 1991, p. 24); whatever other ambient sounds penetrate the abdominal wall protecting the infant from the world. Though the uterus may at times be a somewhat noisy place, the infant rests securely within this sonic world. Outer noises are blunted by multiple insulating layers of muscle and skin, and internal “swooshings” exhibit a rhythmical predictability and familiarity of volume, location, and duration. Sonically speaking, there is little for the infant to fear. The acoustic invariants of the uterus afford the infant physical comfort, the security of regularly fulfilled sonic expectations, and emotional stability. In this stable environment, the prenatal infant is already an active perceiver, developing preferences for stimuli such as their mothers’ voice (DeCasper and Fifer 1980), familiar stories and melodies (DeCasper and Spence 1986), and the sound of their native language (Moon et al. 1993).

Things soon change, however. It has been observed that, “one of the most stressful changes that occurs during the transition from intrauterine to extrauterine life is the loss of rhythm that the fetus has become accustomed to through months of being exposed to maternal movements, breathing, and heartbeat” (Collins and Kuck 1991, p. 24). The soothing sonic world of the womb is replaced by a much harsher alternative. In contrast to the organic symphony of the uterus, the ambient noise⁹ of the neonatal ICU (NICU) is largely structured by the clicking, beeps, and whirring that emerges from machinery used to assist the infant in maintaining a state of healthy equilibrium. But there is an irony here. On one hand, both the machinery, as well as the hustle and bustle of nurses and doctors continually moving throughout the NICU, is geared toward meeting the infant’s biological needs and helping to maintain life support. At the same time, however, this life-sustaining machinery and flow of activity establishes a highly unfriendly sonic world: an environment that works at cross-purposes with the very care it hopes to provide. Sounds that are the “random byproduct of medical technologies (for example, the sound of respirators or the sounds of bottles clanking on the incubator top), the sounds of other infants in distress, or...amplifications of the infant’s own disorganized state through devices such as the heart monitor” (DeNora 2000, p. 80) all collectively shape a noisy, uninviting sound world. This chaotic sound world has the unwelcome effect of disrupting the infant’s basic life processes. It adversely affects neonatal biorhythms

⁹ “Ambient noise” is here understood to be the totality of noises in a perceiver’s environment that are present but not selectively chosen (Wagner 1994).

which, in turn, affect sleep regulation and state lability (Kaminski and Hall 1996, p. 46). This is not a sonic environment that affords security and tranquility, in other words. Rather, it furnishes instability, unpredictability, and emotional and biological disequilibrium.

Music therapy for neonates has emerged in part as a response to this dilemma. A great deal of research supports the idea that music is a valuable resource for enhancing the neonate's physiological and emotional well-being while in the NICU. This is not the place to undertake a comprehensive review of the literature.¹⁰ For present purposes, it is sufficient to note that positive benefits are many. They include: reducing stress; providing stimulation in stimulation-deprived environments; promoting bonding with parents; facilitating neurologic, communication, and social development; exhibiting calming effects on preterm and term infants; increasing oxygen saturation levels and shortening hospital stays (Standley 2001, p. 213); facilitating various kind of physiological and micro-behavioral stability, include stable heart rate, blood pressure, color, feeding, changes in posture, muscle tone, less frantic movements, rhythmic crying, cessation of grimacing, and regularization of sleep/wake cycles (DeNora 2000, p. 81). Apart from these psycho-biological benefits—and anticipating later discussion of the social aspects of musical experience—neonate music therapy also teaches the bodily skills involved in various forms of communicative expression (e.g., temporal coordination of bodily movement and affective expression, interactive turn-taking, etc.). For, “[w]hile the primary mode of awareness for the music therapist is aural, touch and observed bodily gesture also play a part in the reception of interpersonal ‘presentations’ that hold therapist and client in relationship” (Trevarthen and Malloch 2000, p. 5).

Playing music for babies is a form of bodily “entrainment”. Entrainment is the alignment or coordination of bodily features with recurrent features of the environment (DeNora 2000; Clayton et al. 2004).¹¹ By establishing a sonically inviting aural space, the infant perceives music as something to be attended to and appropriated. And the positive outcomes of music therapy—in other words, the fact that neonates are entrained to regulate their internal bodily states and expressive movements with positive recurrent features of this musical environment—affirms that music is an esthetic technology being successfully “employed to mediate tensions between endogenous (bodily) and exogenous (environmental) processes within neonatal intensive care units” (DeNora 2000, p. 79). Music, it would seem, is balm for the neonate's soul.

So why is music therapy so effective? What I suggest is that neonate music therapy succeeds precisely because, from the start, neonates are attuned to various affordances in music. They both (1) recognize music as appropriable (i.e., as furnishing an affordance-laden structure), and (2) they present the prelinguistic perceptual skills needed to actively exploit musical affordances for emotion

¹⁰ For such a review, see Standley (2001).

¹¹ Similarly, Trevarthen and Malloch write that “music is therapeutic because it attunes to the essential efforts that the mind makes to regulate the body, both in its inner neurochemical, hormonal, and metabolic processes, and in its purposeful engagements with the objects of the world, and with other people” (Trevarthen and Malloch 2000, p. 11).

construction and self-regulation. I want to develop and defend the two prongs of this claim in turn.

First, neonates seem immediately capable of discriminating between music and ambient noise. They recognize music *as* music, as an auditory structure somehow qualitatively distinct from the disorganized noise that surrounds them. And they are poised to pick it out of their environment as something they can do things with, as something that furnishes a utility apart from serving merely as sonic wallpaper. Infants perceive this music–noise distinction because “[a]coustically, music is unlike any other sound; it is more pleasant, soothing, and interesting than noise and uses highly preferred frequencies and harmonics selected through centuries of refinement and development of a specific music type” (Standley 2001, p. 212). Both term and premature neonates attend more fixedly to music than to other ambient noises (Standley and Madsen 1990), indicating a preference for the esthetic coherence and organizational structure of music. Other studies have found that infants, like adults, perceive not just holistic musical patterns but additionally fine-grained, formal properties of music such as pitch, melody, tempo, and musical phrase structure (Schellenberg and Trehub 1996; Trehub et al. 1999; Trehub and Schellenberg 1995; Trehub and Trainor 1993). Infants are relatively discriminating listeners. So, not only do infants appreciate the sonic *coherence* of music. Additionally, they find it perceptually interesting because of its emotional *expressivity* (Nawrot 2003). They are able to pick out the particular sound features of music such as melody or phrase structure that “speak” this expressivity and carry emotional content. But surely this prelinguistic attunement to the expressive sound features of music is not particularly surprising, given that, as many researchers have noted, the newborn’s earliest interactions with their mother exhibit a distinctively musical character.¹² This character is established by the infants tuning-in to “subtle shifts in vocal timbre, tempo, and volume variations”, and the ways that they “with their mothers negotiate and share a flexible musical pulse between them, constantly adapting their tempo, intensity, motion, shape, and contour of their sounds, movements, and gestures in order to ‘fit’ and to communicate with one another” (Bunt and Pavlicevic 2001, p. 193). This rich musical code (Papousek 1996) furnishes the neonate with expressive and communicative possibilities. So, it is no great surprise that newborns engage with music in a similarly active and interested way. They emerge from the womb ready to engage and respond musically.

Not only can neonates and infants perceptually discriminate between music and noise, picking out the emotionally expressive features of the former as qualitatively distinct from the latter. Beyond this, neonates and infants present the prelinguistic perceptual skills needed to actively *appropriate* affordances within music for emotion construction and regulation. This is an important distinction. For it is one thing to hear music as music. But it is something else to *use* music, to act on affordances for emotion construction and regulation present within musical structures. However, there are empirical indications that infants both pick up on and exploit emotional affordances in music. Multiple studies have indicated that

¹² See Malloch and Trevarthen (2009) for a collection of papers dedicated to this topic. See also Bunt and Pavlicevic (2001, pp. 193–194).

infants prefer listening to, and show heightened emotional responses toward, infant-directed “musical” speech, as opposed to adult-directed speech, where the former refers to “sing-song” speech intentionally modified to be pleasing to the infant: raised pitch, slowed tempo, elongated vowels, and slow pitch contours with large frequency ranges (Trainor and Heinmiller 1998, p. 78). Infants focus on (i.e., “use”) musical speech, since it affords emotionally pleasant and stimulating exchanges with caregivers. And they seem to do something similar with music, too. Despite the fact that they have no conceptual knowledge of musical scale structure or prior exposure to music, infants display an evaluative preference for consonant over dissonant musical intervals.¹³ Not only can they perceptually discriminate consonant from dissonant interval notes, their prolonged looking indicates an affective preference for the former—even when they are embedded within a more sonically complex “naturalistic context”¹⁴ (Trainor and Heinmiller 1998, p. 83). Zentner and Kagan (1998) found similar results. However, not only did infants look significantly longer at consonant melodies. Additionally, the infants in Zentner and Kagan’s study *used* the consonant melodies to regulate their affective states, that is, to bring about a more inquisitive and emotionally balanced state in relation to their sonic environment. The infants fretted less, exhibited less motor activity (i.e., they were less fidgety and more absorbed in the music), and vocalized more (i.e., expressed interest in the music) during the consonant melodies. Haslebeck (2004) found that, over the course of multiple sessions, the preterm infants in her study would synchronize bodily movements such as sucking (both in rhythm and intensity), tongue and mouth protrusions, and eye opening and closing, with the rising and falling of sung lullaby melodies. So, it appears that the infants in these and other studies engaged with and appropriated the sonic structures in their immediate environment in meaningful ways. One conclusion from this study, as well as the wealth of research on the effectiveness of neonate music therapy, is that “infants’ reactions to different types of music imply that they can detect and act on the emotional message”, that is, the emotional affordances, within music (Nawrot 2003, p. 77).

Ample empirical evidence thus indicates that infants both recognize music as furnishing an affordance-laden structure and that they possess the prelinguistic perceptual skills needed to appropriate it for emotion construction and regulation. Babies know how to do things with music.¹⁵ Since this skill seems to be present from birth, it is likely that “the rudiments of music listening are gifts of nature rather than products of culture” (Trehub 2003, p. 670). Clearly infants lack an awareness of the worldly properties of music (e.g., the circumstances of its production) referenced earlier, since they lack the necessary concepts and propositional knowledge.¹⁶ Instead, they listen transparently. They hear and respond to the sounds themselves in meaningful ways.

¹³ Consonant intervals are stable (i.e., pleasant-sounding) and require no resolution. Dissonant intervals, on the other hand, exhibit a “tense” quality that requires resolution to a constant interval.

¹⁴ Instead of simply playing bare notes for the infant, a second experiment modified a Mozart minuet to produce different versions with predominantly consonant or dissonant intervals, which was then played to the infant.

¹⁵ There is evidence that some nonhuman animals, too, know how to do things with music. See e.g., Patel et al. (2009).

¹⁶ This is not to imply that all causal judgments necessarily require concepts.

Musical affordances and sonic invariants

How do infants know how to do things with music? To return to the central thesis: I suggest that neonates and infants have a rudimentary sensorimotor knowledge that presents music, perceptually, as an affordance-laden structure. This rudimentary sensorimotor knowledge makes music available as something to do things with. It is what gives all of us (including neonates and infants) access to the expressive qualities of music. This sensorimotor knowledge consists in the practical understanding that modulations of bodily movement and attentional focusing affect sensory change. For instance, when we perceive a visual scene, movements of the head or body change the way that occluded objects (e.g., part of a bush obscured by a tree standing in front of it) gradually reveal themselves as I move closer to or around them. We possess similar knowledge of how bodily movements and attentional modulations shape the character and content of musical experience. Rudimentary sensorimotor knowledge is thus the implicit, practical understanding that, as an embodied agent, I possess the sensorimotor skills needed to secure experiential access to different features of my world by using my body in different ways. Being sensitive to the sensorimotor contingencies governing my relation to perceptual objects is what it means to be a “skilled” perceiver.

In developing his sensorimotor account of perceptual consciousness, which he terms “actionism”, Alva Noë offers two conditions under which an object can be said to be perceptually available in experience (Noë 2009). A perceiver must implicitly understand, “in a practical, bodily way, that there obtains a physical, motor–sensory relation between the perceiver and the object or quality, satisfying two conditions:

1. Movement-dependence: movements of the body manifestly control the character of the relation to the object or quality.
2. Object-dependence: movements or other changes in the object manifestly control the character of the relation to the object or quality” (Noë 2009, p. 476).

When I say that babies know how to do things with music, what I mean, then, is that babies implicitly recognize that the sensorimotor relation between themselves and the expressive qualities of music satisfy these two conditions. That is, they immediately recognize music (including its expressive content) as something they can do things with, and they also immediately recognize how to use their bodies to do the things they want to with music. So they know, for example, that moving their head slightly in one direction will allow for more focused attention to an especially pleasing part of a musical piece, bringing about a desired affective response; and they know that allowing their head to linger in that position will continue to afford this focused listening and affective response, at least until the sound source moves and they must adjust their body accordingly. Similarly, they know that turning their head the other way will suppress or “push away”, if ever-so-slightly, the unpleasant dissonant music they find sonically uninviting. Babies thus have an implicit mastery of basic sensorimotor contingencies that govern the way that they are responsively attuned to different affordances in their environment—including emotional affordances in music. Musical qualities afford this interactional engagement. And babies are thus self-conscious music users. Though they lack a sophisticated reflective understanding of themselves and the music, they nevertheless possess an implicit

understanding or self-knowledge of how their bodies allow them to do things with music.¹⁷

If music listening is interactional in the way I have just characterized it, what is it within music that invites appropriation by the infant? In other words, what sonic invariants¹⁸ are present within the music, and which are exploited by the various sensorimotor contingencies linking the infant music user and the musical piece? Two examples we might pick out are music's *textural* qualities and the temporal regularities of its *sonic patterns* (both melodic and rhythmic; DeNora 2000, p. 85). Most of the music used in neonate music therapy is texturally soothing, constant (i.e., no abrupt modulations of volume, tempo, etc.), and relatively unchanging (i.e., it exhibits a temporally predictable melodic and rhythmic pattern). By musical "texture", I am simply referring to the overall quality of the sound of a particular piece, that is, the piece's sonic complexity or amount of things going on within the piece at any moment. Gentle music with simple or "thin" textures reduces alerting responses (Standley 2001, 2002) and thus invites the infant explore its sonic topography with confidence and security. Lullabies, for instance, have been sung in all cultures (Trehub and Trainor 1998) since their simple textures afford security and emotional warmth. Recognizing the practical success of this approach, guidelines for the selection of use of music in NICU therapy urge that the least alerting, texturally simple music styles include the voice alone (either recorded or, ideally, a caregiver's singing), or music with a light rhythmic emphasis, constant rhythm and volume, and melodies in the higher vocal ranges (since infants hear these ranges the best; Standley 2001, 2002). Certain forms of electronic or "New Age-y" music, which often contains ethereal female vocals, light rhythms, and gentle synthesized melodies, might also be an appropriate choice since they are sonically interesting but relatively undemanding for the infant.

In addition to simple textures, lullabies, and soothing electronic music tend to exhibit predictable melodic and rhythmical *patterns*. These patterns emerge slowly, in esthetically interesting ways, as the piece gradually unfolds. Like simple textures, temporally regularized sonic patterns also afford security for the infant. They do this by fulfilling the infant's sonic expectancies. And this fulfillment allows the infant to enact a synchronous, felt connection with the music as the infant anticipates these patterns and experiences these expectancies fulfilled as the patterns emerge and reemerge again and again.¹⁹ This predictability thus affords comfort, as well as a

¹⁷ Jessica Philips-Silver and Laurel Trainor found that bodily movement influences auditory encoding of rhythm patterns in both infants and adults (Philips-Silver and Trainor 2005, 2007). For further discussion and analysis of how bodily movement shapes or "enacts" the character and content of musical experience, see Krueger (2009).

¹⁸ By "invariants", I mean the structural features of the music that specify an array of possible perceptual interactions. These invariants guide the infant's perceptual exploration of a piece—they fix a certain range of possibilities, and open up specific valences of exploration—but they simultaneously leave open array of possible engagements. For instance, as a perceiver matures (both physiologically and experientially) and becomes more esthetically sophisticated, she may pick up on and respond to features of a familiar piece that eluded her during past listening episodes (in addition, as discussed earlier, to picking up various cultural and historical associations only possible with age and experience). She learns to hear a piece with "fresh ears".

¹⁹ This tension–resolution dialectic, which plays with our sonic expectancies (e.g., we anticipate that a dissonant interval will be resolved by a consonant interval), is surely one of the most appealing and viscerally primitive aspects of musical experience for all ages. So, it is no surprise that infants would also find rudimentary forms of this dialectic esthetically interesting and pleasurable.

kind of “mastery” over the music, for the infant. The music becomes an environment that the infant can perceptually conquer, as it were, by experientially understanding it (i.e., by recognizing and anticipating melodic and rhythmical patterns, and experiencing these anticipations being regularly fulfilled). Therefore, the infant perceptually gears onto these predictable patterns, locating them within the music’s structure (by being attuned to the various emotive sound features referenced above) and appropriates them to establish an equilibrium between their own inner states and recurrent features of their sonic environment.

Finally, lullabies and other texturally simple music—unlike, for instance, loud guitar-based rock with shrill vocals—also afford the infant freedom to tune out the music. This sort of music is sonically interesting but perceptually undemanding; it does not overwhelm the infant the way that other music might. This environmental autonomy affords a further kind of security and stability for the infant. The infant can, when it wants to, focus on and explore the music by foregrounding it in its perceptual field. However, when it tires of this active perceiving, it can tune it out and focus on other things, allowing this music to recede into the background. Accordingly, the infant learns that it can actively manipulate, at least to a certain degree, its sonic environment.

In this way, then, do particular qualities in music (e.g., textures and sonic patterns) afford bodily affective entrainment. Via their skilled engagement with music, infants compose both themselves and their musical experience. They do this by constructing their emotions and moods, and organizing their inner states to reflect patterns within their sonic environment. Musical textures and perceptible sonic patterns are thus affordances within music which invite the infant to *attune* itself to its sonic world. And the kinds of emotional self-organization the infant enacts via this attunement mirrors organizational features of its musical environment. In the NICU, music creates worlds that are sonically distinct from, but which are nevertheless conditioned by, the sound world of NICU. These musical sound worlds mask the irregularity of NICU ambient noise while creating environments affording state regulation and the construction of pleasant emotions. So, a coordination or organizational regularity between bodily states and recurrent environmental features is realized within the infant’s enactive relation to the music. Certain features of the music afford focused listening and emotional responses for the infant—but these same features only become salient, or stand out experientially, once the infant engages with the music in an active, sensorimotor way.²⁰

Of course, we do not stop using music as infants. Throughout our lives, music remains a powerful tool for cultivating and reinforcing emotional expression and

²⁰ Colwyn Trevarthen (1999, Trevarthen and Malloch 2000) reports a vivid example of this sort of sensorimotor engagement. He describes a 5-month-old baby, born blind, who “without prompting or training, and, indeed without her mother being aware of her graceful rhythmic gestures, conducts portions of the melodies of famous Swedish baby songs...with her left arm and hand” (Trevarthen and Malloch 2000, p. 13). Trevarthen describes how the infant’s arms rise and hands widen when the swelling of the song intensifies, and how her hands suddenly close and drop when the stanza concludes. Presumably, the infant experientially feels that the dynamic qualities of the music (e.g., textures and patterns) afford this sort of active engagement, and that her esthetic appreciation of the music is deepened via this intimate sort of “bodily listening”. Trevarthen notes that, “Microanalysis of the video reveals a marvelous instinctive performance of transmodal musicality, which suggests that the infant is making an original performance with parts of her body she has never seen” (Trevarthen and Malloch 2000, p. 14).

social identities, particularly during adolescence (Zillman and Gan 1997). But the point of this section is simply that, from birth, music is perceived as an affordance-laden structure, furnishing possibilities for emotion construction and regulation. Later uses of music throughout our life build on this primitive appreciation for the sorts of uses music affords us. But we rarely listen to music alone. I now want to look at social aspects of musical experience.

Doing things with music, with others: social affordances and shared listening

When we do things with music, we are doing things, musically, in social contexts. Our acts of “musicking” deeply implicate others. This is because “[t]he act of musicking establishes in the place where it is happening a set of relationships, and it is in those relationships that the meaning of the act lies” (Small 1998, p. 13). In addition to the emotional affordances explored above, music also harbors what we might term “social affordances”.²¹ Using music to construct and regulate emotional experiences and coordinate action is often a joint venture, a social practice fundamentally shaped by the shared presence of multiple perceivers. The materiality of music as a thing in the world makes it socially accessible. For, despite its tendency to evoke otherworldly emotions, music is, after all, a material artifact situated in a particular time and place. And artifacts, as socially situated entities, “bring people together, and serve as a focus of joint activity” and attentional coordination (Costall 1995, p. 471). Music, in particular, serves as a socially available esthetic technology for interpersonal coordination and emotional convergence—a tool for shared action and feeling. Music thus affords what Alfred Schutz calls a “mutual tuning-in relationship” (Schutz 1976, p. 161). According to Schutz, this is a relationship in which “the “I” and the “Thou” are experienced by both participants as a “We” in vivid presence” (Schutz 1976, p. 161). Social affordances in music therefore furnish possibilities for constructing relationships and situations (i.e., sonic worlds) that shape the character and content of musical experience for multiple subjects. I want to investigate this idea more carefully now.

Consider first how the nature of musical experience is profoundly social. Music permeates public spaces: churches, temples, concert halls, elevators, markets, shopping malls, pubs, restaurants, corporate offices, athletic stadiums, bedrooms, and dining rooms—and nearly everywhere else humans come together to do things with others or alone. In these public spaces, music is generally played to enhance the affective coloring of these diverse listening contexts and often to coordinate collective action. For example, within the compressed space of an air-deprived elevator, gentle background music is offered to distract the nervous rider and conjure feelings of spaciousness, liberation, and release. The mournful reverence of funeral music both speaks and, in part, shapes the collective grief of those in attendance; the music individuates and simultaneously unifies those present in their shared sadness.

²¹ To be clear, one of the main points of this section is that the emotional affordances discussed previously are intersubjectively accessible. They can be exploited by multiple perceivers, and thus shape these perceiver’s shared experiences of a piece of music. So, the emotional and social aspects of a musical affordance are just that: aspects of the same musical affordances.

Loud rock music at an athletic event is played to elevate the crowd's enthusiasm and, at times, coordinate their actions (e.g., standing up and cheering in unison).

Even solitary listening episodes are social affairs. The angst-ridden adolescent—holed up in his dark bedroom, headphones firmly in place while listening to that week's favorite tune for the umpteenth time at high volume—is musicking against a rich background network of social relationships and practices: the peers who played a role in determining his musical tastes and who taught him how musicking can become an outlet for emotional expression; the parents who helped cultivate an appreciation of music, and provided the space in which to listen; the cultural images, associations, and values conjured by the different musical genres that pass through his headphones from week to week. Even his decision to retreat to the solitude of his room to listen to music alone is a social gesture of moody defiance. Similarly, the solitary flute player, practicing his craft one lonely night on the plains of Africa, plays “within the limits of the style he received from the group, and in playing that style he will be exploring, affirming, and celebrating the concepts of relationship of the group, as well as his own relationships within it and with it” (Small 1998, p. 204). Music invariably summons the presence of the Other.

However, not only are our listening *contexts* socially specified. Our listening *content*, too, is (at least, very often) socially specified. In other words, I suggest that “the situation can determine...what it is that the listener hears in or extracts from the music” (Sloboda 2005, p. 320). In the previous section, I picked out two sonic invariants within music that neonates latch onto to construct and regulate emotion: musical textures and the temporal regularities of sonic patterns. These invariants, I argued, are aspects of musical structure that afford appropriation by the infant. These invariants are also sound features that carry a piece's expressive content. I now want to suggest that since this expressive content is an aspect of the materiality of music, an aspect of its structure as an artifact in the world, it is intersubjectively available, ready to shape, and coordinate the shared experience of multiple listeners. I will explore the social aspect of doing things with music by looking specifically at how music affects interpersonal coordination and emotional convergence within joint attention to music.

Joint attention and emotional convergence in musical experience

Music has potent organizational and social powers. Since music is a temporal medium, one which dynamically fluctuates from moment to moment and medium to medium (i.e., how and where a piece is played), it is an ideal tool for corporeal and social entrainment (DeNora 2000, p. 143). Social affordances in music afford joint entrainment and allow us to experience music with others in a very intimate way. I suggest that this shared listening, which involves a mutual attunement to the social affordances in music, modifies how music is given (i.e., phenomenally manifest) to multiple experientially integrated, perceiving subjects.

Understanding the phenomenon of “joint attention” is relevant.²² Joint attention is the mutual attending to an object in the environment where, crucially, those

²² Tom Cochrane's (2009) excellent discussion of joint attention and musical experience goes well beyond what is possible here.

attending are aware not just of the object but also of *others' awareness* of the object. The others' awareness of an environmental object is "mutually manifest" to all participants (Sperber and Wilson 1986, p. 186). Developmentally speaking, the ability to engage in episodes of joint attention is seen as a significant milestone since it purportedly signals that the preverbal infant has well and truly begun to self-consciously participate in the social world. For joint attention is only possible if participants mutually acknowledge the presence of other minds.²³ Following John Campbell (2002), I want to suggest that there is a fundamental shift in the phenomenological nature of perceiving in a mode of solitary attention versus joint attention. In other words, "[j]ust as the object you see can be a constituent of experience, so too it can be a constituent of your experience that the other person is, with you, jointly attending to the object" (Campbell 2002, p. 161). And this experiential integration, or mutual coordination of attention, modifies how the object (e.g., a piece of music) is phenomenally manifest to the joint attenders. Music affords this intimately shared experience.

What does this mean, and how is this accomplished? What it means, simply put, is that a piece of music is heard as experientially different when two or more perceivers are jointly attending to a piece's social affordances than during solitary listening episodes. Doing things, musically, with others, alters the phenomenal character of music. And this modification is accomplished via the shared attentional framework that is enacted within episodes of joint attention, and which is responsive to a musical piece's social affordances. This shared attentional framework does not just fix the *content* of joint attending (e.g., two people are aware of simultaneously attending to identical sound features of a musical piece) but additionally the *activity* of joint attending (e.g., the means by which the sound features emerge and stand out, experientially, for the co-attenders; Cochrane 2009, p. 62). Within this activity of joint attending, the other's means of experiential access to the joint object of attention becomes a constituent feature of *my* experiential access to it, and vice-versa.

To clarify, consider first the experience of listening to live music of any genre along with hundreds or even thousands of other listeners. On a general level, this shared listening context is organized by a phenomenally palpable *intensity* not possible in solitary listening episodes. Each listener is vividly conscious of the presence of many other joint attenders (including their attentive focus on the music being performed).²⁴ Within this context, the Other is a constituent of individual listeners' moment-to-moment experience of the music. And this large-scale attentional structure—and the tension and intensity that is generated by it—is "dependent on the sheer numerical concentration of attentive states that the mass audience generates. Every event in that space has massively increased social consequences" (Cochrane 2009, p. 68). Thus, the music within that social context is

²³ Joint attention is also said to make possible the later development of linguistic communication (Bruner 1977), as well as the ability to assume a reflective stance on the world, as opposed to simply being practically immersed in it (Werner and Kaplan 1963).

²⁴ This awareness need not be, and generally speaking is not, an explicit attending to others as an additional object (i.e., as an object of experience alongside the music, for instance). Rather than being the target of an explicit process of monitoring, the Other instead serves as a kind of phenomenal filter or framework through which explicit objects of attention (e.g., the musical piece) are given. I trust that the descriptions provided make this distinction sufficiently clear.

given differently, in an experiential sense, than when listening to that same music alone.

To see how this is so, consider how the shared attentional framework in a live music setting affects the perception and appropriation of social affordances in music. To return to two kinds of affordance discussed earlier, consider in particular the role that the crowd's latching onto musical textures and sonic patterns plays in shaping the shared experience of a piece within a live music setting. The simple act of a guitarist casually strumming the first few chords of a popular song—especially at the beginning of a concert—immediately elicits a thunderous roar of approval. Within a moment, the crowd's attention is galvanized around these textures, snapping into a mode of taut expectancy; the atmosphere is flush with anticipation of the song that will soon follow. Once this familiar refrain begins, the texture of a piece is progressively fleshed out by the introduction of new elements: the initial guitar strumming is soon girded by the rhythmic pulsing of the bass accompaniment; keyboards emerge to fill in the sound even more, enriching and deepening the sonic structure; next, the drums enter, stabilizing and accelerating the song's forward momentum; finally, vocals materialize, their aurally discernible human character lending a sense of qualitative unity to the piece as a whole (in addition to whatever narrative dressing the lyrics offer). This gradually unfurling sonic world, its topography established within these musical textures, invites shared exploration and appropriation. That this is so becomes clear when we observe how the emergence of each new aspect of these textures elicits new responses from the audience (modulations of head bobbing, swaying, and bodily movements, dancing, shouts of encouragement, etc.), as well as a collective refocusing of attention on each emergent sound features as it comes forward. The musicians perceive and respond to these cues, which in turn shapes the audience's further responses and attentional refocusing. Within this organic performer–perceiver interplay, then, a shared attentional framework emerges unique to that time and place. The material mediation of this particular music event—the way that the live music event is embodied in things like the number of listeners, the spatial location of the performance, the musical skills of the performers and audience, and the social values of the attendees—determines both (1) what sort of shared attentional framework emerges in that context and (2) how musical textures are perceived and appropriated by multiple perceivers via this attentional framework. If the audience were to suddenly disappear, save for one lone listener, the ambient intensity, tension, and attentive focus to particular musical textures would also disappear—and the phenomenal character of the music-as-given to our lone listener would be dramatically altered. Try as we might, we simply cannot recreate this atmosphere within our solitary listening episodes.

To continue with this example: an integral part of many live music experiences is dancing. Dancing can be seen as a kind of latching onto sonic patterns, a process of attentional focusing that shapes how and what we hear. Via dancing, the temporal regularities of melodic and rhythmical patterns of music are physicalized within an array of bodily movements. The animate body physicalizes the shared temporality of the music event. And the coordination between sonic pattern and bodily movement—an instance of bodily entrainment—is a perceptual exploration of the piece's sonic topography. Bodily movements modulate the listener's relation to

different features of the piece, such as meter and melody; dancing experientially foregrounds these features and shapes the way that these features stand out, phenomenologically, against the background of the piece's other sound features. The temporal predictability and consistency of sonic patterns—as well as the piece's compositional structure, that is, the way that musical components like individual tones and rhythmic progression hang together in “aural space”, giving the piece its sonic coherence—afford this sort of bodily engagement. Sonic patterns therefore afford an entering into this sonic space, a point of access for losing ourselves, experientially, within the piece via the immersive “deep listening” that often occurs whilst dancing.²⁵

Yet, to return to joint attention, while dancing at a live music performance the listener is not simply aware of and responding to musical affordances. Additionally, part of the content of the dancer's awareness is the dancing-responses of *other* dancers. Their attunement and reaction to sonic patterns shapes the listener's own experience of these patterns. Dancing is thus a vehicle of joint attention, a means of enacting a shared attentional framework that shapes the character and content of the piece-as-perceived in that context. When others' dancing reactions shift, for instance, I feel my body compelled to alter my own movements accordingly. I bob my head in time and sway my body, carried along by the pulse and tempo of the crowd's movement. Thus, I co-inhabit the lived time of the musical piece with others. The rhythmical and sonic patterns of a piece, and the dancing these patterns afford, forge an interactive phenomenon that “synchronizes the listeners to one body—to one moving mass” (Vickhoff and Malmgren 2004, p. 19). This “one moving mass” enacts a shared attentional framework unique to that time, place, and performance. However, both the individual as well as collective integrity of the experience simultaneously co-exists within that musical experience. Participants within that shared experience are able to interpret a steady flow of musical features and patterns in individual terms, while the temporal regularities of the sonic invariants discussed “act to coordinate their behaviors and attentional foci” (Cross 2006, 122).

This understanding of dancing as joint attention, then, shows us how emotional convergence emerges within shared listening contexts. As described above, dancing is a kind of mass entrainment: a coordinated response to and appropriation of affordances within a shared sonic environment. Within that situation, individual's sensorimotor engagement with the music modulates not only their relationship to the music but to other listeners—that is, other participants within that unique attentional framework—as well. This intimate sensorimotor coordination establishes a mutual emotional resonance between the participants, a convergence of affective and emotional responses. When others cheer and shout, I feel my own responses swell and surge accordingly. During quieter moments, when audience members sit and listen in a more somber mode, my own response levels, assuming a gentle equilibrium with theirs. This ongoing dynamic of coordination and convergence is, simultaneously, a tacit affirmation that “I” and “Thou” have, in this context, enacted

²⁵ For more on the spatial and kinesthetic aspects of music perception, see Krueger (2009).

an experiential “We”. Cochrane puts the point well when he observes that, [b]y interdependently structuring listener’s perceptual activities, joint attention provides a solid foundation for such convergence. Moreover, when listeners can clearly observe, negotiate, and agree on their emotional responses, a significant part of their experience will involve an awareness that it is the same for others (Cochrane 2009, p. 73).

Doing things within music, with others, is thus a kind of “mutual tuning-in relationship”, to return to Schutz’s apt phrase. It alters the phenomenal character of the music as perceived. Mutual tuning-in to social affordances is a shared experience, grounded in joint attention.²⁶ Social affordances in music are thus perceived and appropriated as a group—and crucially, they are *experienced*, on an individual level, as being perceived and appropriated as a group. Individual listeners are immediately aware of the joint attention of other perceivers focusing on and doing things with the music—again, this shared awareness is what lends that context its intensity and its tension—and in this sense is the “I” and the “Thou” “experienced by both participants as a “We” in vivid presence” (Schutz 1976, p. 161). Joint attention enables a new kind of skillful engagement with the musical piece, opening up the piece, experientially, in novel and fresh ways. Simply put, it affords a new sort of perceptual play that intimately implicates the experiences and feelings of others. I do not just hear the music. I hear the others hearing the music. And *my* experience of the music changes accordingly. This intimacy of experience serves notice that, even in the throes of an experience as deeply personal as is listening to music, the Other is a constituent of our skillful engagement with musical affordances. Music is an especially profound expression of our social being and of the varied ways that we relate to one another. Doing things with music, with others, thus allows us to share our feelings and experiences, and in doing so to savor the intimacy of human relationship within our everyday lives.

References

- Bruner, J. (1977). Early social interaction and language acquisition. In H. Schaffer (Ed.), *Studies in other-infant interaction* (pp. 271–289). New York: Academic Press.
- Bunt, L., & Pavlicevic, M. (2001). Music and emotion: Perspectives from music therapy. In P. N. Juslin & J. A. Sloboda (Eds.), *Music and emotion: Theory and research*. Oxford: Oxford University Press.
- Campbell, J. (2002). *Reference and consciousness*. Oxford: Clarendon Press.
- Clayton, M., Sager, R., & Will, U. (2004). In time with the music: The concept of entrainment and its significance for ethnomusicology. *ESEM Counterpoint*, 1, 1–82.
- Chemero, A. (2003). An outline of a theory of affordances. *Ecological Psychology*, 15(2), 181–195.
- Clarke, E. F. (2005). *Ways of listening: An ecological approach to the perception of musical meaning*. Oxford: Oxford University Press.
- Cochrane, T. (2009). Joint attention to music. *British Journal of Aesthetics*, 49(1), 59–73.
- Collins, S., & Kuck, K. (1991). Music therapy in the neonatal intensive care unit. *Neonatal Network*, 9(6), 23–26.

²⁶ This sort of experience is not *necessarily* shared, since some listeners (i.e., musicians, musically experienced listeners, etc.) will likely be attuned to subtle sound features that elude others. Nevertheless, research indicates a convergence of responsiveness to the emotional content of music (e.g., Fritz et al. 2009), that is, a common tendency to “read” the expressive content of music in a similar way. This fact further explains why the phenomenon of emotional contagion is so prevalent within live music contexts.

- Costall, A. (1986). The “psychologist’s fallacy” in ecological realism. *Teorie & Modelli*, 3, 37–46.
- Costall, A. (1995). Socializing affordances. *Theory Psychology*, 5(4), 467–481.
- Cross, I. (2006). Music and social being. *Musicology Australia*, XXVIII, 114–126.
- Davies, S. (2001). Philosophical perspectives on music’s expressiveness. In P. N. Juslin & J. A. Sloboda (Eds.), *Music and emotion: Theory and research* (pp. 23–44). Oxford: Oxford University Press.
- DeCasper, A., & Fifer, W. (1980). Of human bonding: Newborns prefer their mothers’ voices. *Science*, 208, 1174–1176.
- DeCasper, A., & Spence, M. (1986). Newborns prefer a familiar story over an unfamiliar one. *Infant Behavior & Development*, 9, 133–150.
- DeNora, T. (2000). *Music in everyday life*. Cambridge: Cambridge University Press.
- Fritz, T., Jentschke, S., Gosselin, N., Sammler, D., Peretz, I., Turner, R., et al. (2009). Universal recognition of three basic emotions in music. *Current Biology*, 19(7), 573–576.
- Gibson, J. J. (1966). *The senses considered as perceptual systems*. Boston: Houghton Mifflin.
- Gibson, J. J. (1979). *The ecological approach to visual perception*. Hillsdale: Lawrence Erlbaum Associates.
- Hamilton, A. (2007). *Aesthetics and music*. New York: Continuum.
- Haslebeck, F. (2004). Music therapy with preterm infants—Theoretical approach and first practical experience. *Music Therapy Today (online)*, 5(1), 1–15. Retrieved August 3, 2009, from <http://www.musictherapyworld.de>.
- Heft, H. (2001). *Ecological psychology in context: James Gibson, Roger Barker, and the legacy of William James’s radical empiricism*. Manwah: Lawrence Erlbaum.
- Hicks, F. (1992). The power of music. *Nursing Times*, 88, 72–74.
- Kaminski, J., & Hall, W. (1996). The effect of soothing music on neonatal behavioral states in the hospital newborn nursery. *Neonatal Network*, 16, 45–54.
- Katz, S. (1987). Is Gibson a relativist? In A. Costall & A. Still (Eds.), *Cognitive in question* (pp. 115–127). Brighton: Harvester.
- Krueger, J. (2009). Enacting musical experience. *Journal of Consciousness Studies*, 16(2–3), 98–123.
- Levinson, J. (2005). Musical expressiveness as hearability-as-expression. In M. Kieran (Ed.), *Contemporary debates in aesthetics and the philosophy of art* (pp. 192–206). Oxford: Blackwell.
- Malloch, S., & Trevarthen, C. (Eds.). (2009). *Communicative musicality: Exploring the basis of human companionship*. Oxford: Oxford University Press.
- Moon, C., Cooper, R., & Fifer, W. (1993). Two-day-olds prefer their native language. *Infant Behavior & Development*, 16, 495–500.
- Nawrot, E. S. (2003). The perception of emotional expression in music: Evidence from infants, children and adults. *Psychology of Music*, 31(1), 75–92.
- Noë, A. (2009). Conscious reference. *The Philosophical Quarterly*, 59(236), 470–482.
- Nonken, M. (2008). What do musical chairs afford? On Clarke’s ways of listening and Sacks’s musicophilia. *Ecological Psychology*, 20(4), 283–295.
- O’Callaghan, Casey, “Auditory Perception”, *The Stanford Encyclopedia of Philosophy* (Summer 2009 Edition), Zalta E. N. (Ed.), URL = <<http://plato.stanford.edu/archives/sum2009/entries/perception-auditory/>>.
- Papoušek, H. (1996). Musicality in infancy research: Biological and cultural origins of early musicality. In I. Deliège & J. Sloboda (Eds.), *Musical beginnings* (pp. 37–55). Oxford: Oxford University Press.
- Patel, A. D., Iversen, J. R., Bregman, M. R., & Schulz, I. (2009). Experimental evidence for synchronization to a musical beat in a nonhuman animal. *Current Biology*, 19(10), 827–830.
- Philips-Silver, J., & Trainor, L. (2005). Feeling the beat: Movement influences rhythm perception. *Science*, 308, 1430.
- Philips-Silver, J., & Trainor, L. (2007). Hearing what the body feels: Auditory encoding of rhythmic movement. *Cognition*, 105(3), 533–546.
- Pinker, S. (1997). *How the mind works*. New York: Norton.
- Schellenberg, E. G., & Trehub, S. E. (1996). Natural musical intervals. *Psychological Science*, 7(5), 272–277.
- Schutz, A. (1976). Making music together: A study in social relationship. In A. Broderson (Ed.), *Collected papers* (Vol. 2, pp. 159–178). The Hague: Nijhoff.
- Scruton, R. (1997). *The aesthetics of music*. Oxford: Clarendon Press.
- Sloboda, J. A. (2005). *Exploring the musical mind: Cognition, emotion, ability, function*. Oxford: Oxford University Press.
- Small, C. (1998). *Musicking*. Middletown: Wesleyan University Press.
- Sperber, D., & Wilson, D. (1986). *Relevance: Communication and cognition*. Cambridge: Harvard University Press.
- Standley, J. (2001). Music therapy for the neonate. *Newborn Infant Nursing Reviews*, 1(4), 211–216.

- Standley, J. (2002). A meta-analysis of the efficacy of music therapy for premature infants. *Journal of Pediatric Nursing, 17*(2), 107–113.
- Standley, J., & Madsen, C. (1990). Comparison of infant preferences and responses to auditory stimuli: Music, mother, and other female voice. *Journal of Music Therapy, 27*, 54–97.
- Stoffregen, T. A. (2003). Affordances as properties of the animal-environment system. *Ecological Psychology, 15*(2), 115–134.
- Trainor, L. J., & Heinmiller, B. M. (1998). The development of evaluative responses to music: Infants prefer to listen to consonance over dissonance. *Infant Behavior & Development, 21*(1), 77–88.
- Trehub, S. E. (2003). The developmental origins of musicality. *Nature Neuroscience, 6*(7), 669–673.
- Trehub, S. E., & Schellenberg, E. G. (1995). Music: Its relevance to infants. *Annals of Child Development, 11*, 1–24.
- Trehub, S. E., Schellenberg, E. G., & Kamenetsky, S. (1999). Infants' and adults' perception of scale structure. *Journal of Experimental Psychology, 25*(4), 965.
- Trehub, S. E., & Trainor, L. (1993). Listening strategies in infancy: The roots of music and language development. In S. Mcadams & E. Bigand (Eds.), *Thinking in sound: The cognitive psychology of human audition*. Oxford: Oxford University Press.
- Trehub, S. E., & Trainor, L. J. (1998). Singing to infants: Lullabies and play songs. *Advances in Infancy Research, 12*, 43–77.
- Trevarthen, C. (1999). Musicality and the intrinsic motive pulse: Evidence from human psychobiology and infant communication. *Musicae Scientiae, Special Issue on Rhythms, Musical Narrative, and the Origins of Human Communication*, 157–213.
- Trevarthen, C., & Malloch, S. N. (2000). The dance of wellbeing: Defining the musical therapeutic effect. *Nordic Journal of Music Therapy, 9*(2), 3.
- Vickhoff, B., & Malmgren, H. (2004). *Why does music move us? Philosophical Communications, Web series No 34*. Sweden: Department of Philosophy, Göteborg University. ISSN 1652-0459.
- Wagner, R. (1994). *Introductory musical acoustics*. Raleigh: Contemporary Publishing.
- Werner, H., & Kaplan, B. (1963). *Symbol formation*. Hillsdale: Earlbaum.
- Zillman, D., & Gan, S. (1997). Musical taste in adolescence. In D. Hargreaves & A. North (Eds.), *The social psychology of music*. Oxford: Oxford University Press.
- Zentner, M., & Kagan, J. (1998). Infants' perception of consonance and dissonance in music. *Infant Behavior & Development, 21*(3), 483–492.