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ARTICLE

Music on the move: understanding music as otherwise knowledge in early childhood

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Abstract
Posthuman understanding of music and bodies as matter highlights otherwise forms of musical embodied learning. In this paper, we focus on an early childhood classroom music event and think diffractively with cognitive and posthuman theories in order to extend our insight into it. Accordingly, we explore cognitive approaches to music and movement, as well as posthuman concepts such as agency, embodiment, affect and desire, (de)territorialisations and assemblages. As music educators, we acknowledge the relationship between music and movement in early childhood, but our posthuman reading of the event enables a more equitable understanding of children's music learning.

Keywords: Posthumanism; assemblage; embodiment; early childhood; music education

Introduction

The recent posthuman turn in educational research has enabled scholars to consider topics that until recently have been left out of research, such as affect (Dernikos et al., 2020), embodiment (Perry & Medina, 2015; Ellingson, 2017), matter (Hickey-Moody, 2020) or a new concept of childhood (Murris, 2016). The posthuman troubling of Western humanist ways of knowing, based on the mind/body binarism, opens doors to overcome (humanist) barriers and limits by constructing the world otherwise. Kuby and Rucker (2020) use the term *otherwise* to highlight the non-linear, non-skill based, unexpected, equitable and relational dimensions of literacy. In educational contexts, thinking in otherwise terms involves considering ways of knowing beyond preconceived and stereotypical configurations of childhood. The questioning of binaries such as adult/child or man/nature allows a different understanding of the way in which children construct worlds with their bodies (Malone, 2019) and the levelling of the child with the adult, thereby acknowledging the child as a fully capable and autonomous being who should not be dominated, misjudged or alienated just because of being a child (Murris, 2016). The awareness of how the non-human is intertwined with the human leads to a decentring of the human and a widening of the lens through which we look at the world. In doing so, new and suggestive perspectives emerge that allow us to view the world with a fresh gaze.

Posthumanism (along with other related poststructuralist theories, such as critical feminism or new-materialism) has provided the impetus for new perspectives on research, hence post-qualitative methodologies (MacLure, 2013). The consequences can be profound, such as the immersion of the researcher in the data or the questioning of linguistic discourse as the privileged way to construct knowledge. Consequently, both posthumanism and post-qualitative

methodologies open up other ways to understand research in education, in which music and sound acquire special relevance due to the affective power of sound (Gallagher, 2016), its agential character (Dernikos, 2020), its intertwining with movement (Hackett & Somerville, 2017) or the agentialities of silence (Wargo, 2018).

The idea of knowledge acquisition in childhood, understood as a linear process in which children progress from one stage to another guided by a teacher, has been denied by scholars who appeal to the nature of children's being in the world (Hargreaves & Lamont, 2017). Although enactive or phenomenological approaches to music cognition highlight the role of movement and bodies, the idea of music as cognition is seldom questioned and possesses a dominant position among educators. Music cognition as a tool for developing other skills has helped to justify its presence in the general educational system, even when these skills – memory, logic thinking, attention – perpetuate the mind/body divide and overlook the complexity of music learning (Bowman, 2004). The adult's attempt to order learning in a linear chronology 'not only overlooks children's deep entanglement with places, things, objects and atmospheres, it also assumes a particular kind of sanitized adult, capable themselves of being extracted from place, community, pain, stress, trauma and affective flow' (Hackett, 2021, 154). For music educators, attending to the multiplicity of relations, agentialities and embodiments entangled in children's musicianship may enrich the paradigm of what counts as music education, far beyond adults' expectations about the development of musical knowledge. Therefore, in this article, we ask ourselves about the paths opened when we read a musical event in a classroom of 5-year-olds. More specifically, we think about the following questions:

- What kind of music relations are being overlooked if we only apply a cognitive theoretical frame?
- How do cognitive and more-than-human readings of an event interrupt the inquiry on the (children) bodies' entanglements?
- Can we challenge the idea of flaw, mistake and knowledge in the school if we open our lens to the more-than-human?

This paper offers a dialogue between a posthumanist and more-than-human reading of a musical event in a classroom and a reading based on the cognitive approach that underlies current Western educational curriculums and many educators' pedagogical practices. We understand this cognitive approach as deductive, logical and disembodied, where music owes its presence in the classroom to its equation with other objective, mind- and language-based forms of knowledge (Bowman, 2004). To this end, we draw on theories about movement, embodiment and music understanding coming from the two theoretical perspectives of posthumanism and developmental cognition. Following Barad (2007), we diffract our analysis of this event into them, seeing them not as oppositions but as 'overlapping optical intra-actions in practice' (Murris & Bozalek, 2019, 874). Murris (2016) uses the example of 'waves of water closely rolling towards the beach, "interfering" with each other, adding to each other's force and without clear boundaries' (Murris, 2016, 130) to illustrate how divergent ideas overlap when thinking diffractively. In our research, the two different theoretical propositions – cognitive and posthuman – diffract as we read through different concepts instead of against them (Schrader, 2023). Our diffractions aim to show what each approach can offer to contemporary music education.

Movement and music in early childhood education: theoretical groundings for an ongoing dialogue

Music educators who draw on a cognitive paradigm have highlighted the relevance of movement and dance in the musical development of children under 8 years old. Some of them draw on Piaget's developmental theories and his proposition that children learn through their bodies or on

the kinetics intelligence proposed by Gardner, to argue the benefits of associating movement and dance in educational contexts (Minton & Faber, 2016). As noted by Hargreaves and Lamont (2017), movement has been proposed as a tool to analyse children's responses to music stimuli, as an indicator of children's engagement with music (Brown, 2016) and as a more complete way to relate to music (Davis, 2016). The multiple benefits of movement and dance in education include cognitive, emotional and social advances, based on the principle that motor development is essential to other aspects of development. Koff (2000) suggests that movement and dance may help young children to use up their energy in the classroom and prepare them for moving on to more static tasks. Although movement seems to be a powerful resource in practice- and phenomenology-based music education, Bowman and Powell (2007) have pointed out the overall failure to integrate an embodied perspective fully in the classroom.

Researchers tend to differentiate dance and movement, depending on the level of organisation and complexity. Dance has been defined as a highly organised, pre-designed sequence of movements, whereas movement tends to be seen in a more general way, associated with improvisation and freedom (Faber, 2017). Other conceptualisations have also been proposed in educational contexts (Wiens, 2015). Martín Escobar (2005) also describes two kinds of movement in the early childhood classroom, namely rhythmic dances and songs with gestures. The latter have been frequently used to represent the meaning of lyrics (Paquette & Rieg, 2008) and to improve linguistic skills, such as vocabulary acquisition and retention (Coyle & Gómez Gracia, 2014). Faber (2017) transcends the music–gesture association in linguistic development when she proposes free movement as a facilitator of children's cognitive and spatial skills and as the provider of a system of symbols prior to language development. In this process, dance becomes an embodiment of complex and resourceful thought, which extends its impact to a wide range of cognitive and social skills (Minton & Faber, 2016).

The link between movement and language development resonates with research about the benefits of music education for cognitive and linguistic skills. Although the degree of association between music training and language and literacy skills development varies, some research points to the benefits of music training for improving the level of reading in children (Slater et al., 2014). For children aged 3–5, Mullen (2015) reported the benefits of nursery rhymes in developmental areas such as physical health, language and cognition or social competence.

Bowman and Powell (2007) have discussed music educators' oblivion to human bodies as knowledge. Although phenomenologists may regard bodies as ways of knowledge, posthuman and new materialist approaches level the mind and body (Braidotti, 2019). This levelling (Snaza et al., 2016) offers the possibility of no longer seeing bodies and movement as the product of a superior mind; rather, they have been regarded as central in children's meaning-making and learning (Hackett & Somerville, 2017). Matter, as stated by Snaza and Sonu (2016, 32), is active and productive, lending value to the 'multitude of systems and forces that engender a specific scenario or condition'. Music and sound, as matter, participate in such meaning-making (Powell & Somerville, 2020), where movement arises not as a quality but as a means of signification that defines the contouring, forces and intensities of bodies (Manning, 2014).

More-than-human bodies involve the human and the non-human (Hackett, 2021) and come-to-be in their relations and assemblages. Desires, intensities and affect constitute sets of relations in which bodies come to be (Buchanan, 2021). Assemblages, from this perspective, are not the sum of bodies but their operational network defined by their dynamic relations, understood as interactions coming from the inside (Guyotte et al., 2020). Assemblages, being productive and mobile, have been described as ongoing processes of merging and branching of matter, discourses and social dynamics (Daniels, 2021a). Moments in which movement flourishes are full of flows of affect, multiplicities and emergence, especially when sound is part of these relations (Borovica, 2019). The affective power of sound has been described by Gallagher (2016) and Dernikos et al. (2020), highlighting its role in more-than-human assemblages.

The iteration of assemblages creates territories, understood as fixed, predictable and normative structures (Deleuze & Guattari, 1987). Far beyond a limited spatial meaning, territories are made up of heterogeneous elements and contain an internal organisation that tends to preserve their own principles and structures (Parr, 2010). Territories may be challenged by lines of flight, moves that trouble the well-known routines of territories, and create new and unexpected deterritorialised assemblages (Deleuze & Guattari, 1987). Music, as both agential matter and art, is 'capable of that destruction and deformation that destroys territories and enables them to revert to the chaos from which they were temporarily wrenched' (Grosz, 2008, 13).

From paying attention to interrupting: a methodological journey

The data we analyse in this paper were gathered in the context of a wider research project in the south of Spain. The children's parents were aware of the research's aims and scope and signed a written informed consent agreement, according to the policies of the University of Sevilla. All the names in this article are pseudonyms. This project applied an ethnographic collaborative approach (Pahl et al., 2022), where data gathering was based on observation, field notes and audio-visual recordings. Our observation cannot be considered either objective or neutral, for we accept our presence in the classroom as part of its assemblage. In this being-in-the-world, we apply post-qualitative research techniques (St. Pierre, 2019), where the qualitative 'paying attention' is challenged by the post-qualitative 'interrupting' (Malone & Murris, 2022, 145).

The current paper draws on specific data belonging to a session in which a group of 22 five-year-olds, their teacher, Edith, and Alejandra, one of the researchers, were all present. The research team had been working in the field with this group weekly for 2 years, so the presence of the researcher, sitting on a children's chair in the circle of children, wasn't seen as intrusive. The event, one where the class listens to a song selected by Edith, was recorded by Alejandra using her mobile phone. Therefore, we, as researchers, watched and, at the same time, gathered as much data as our lens determined was worthy of analysis.

Our analysis is structured in two layers in which we address each of Malone and Murris' propositions (2022). In the first layer, we 'pay attention' to our data and read it from a cognitive perspective on music, movement and educational purpose. In the second layer, we explore the possibilities opened when we 'interrupt' and consider ourselves as agents in the data (Ellingson & Sotirin, 2020). Hence, our data are no longer a raw material waiting for our shaping but a dynamic construction in which the decentred human operates together with human and non-human beings (Gullion, 2018).

We think with theory in our analysis, and we engage with Jackson and Mazzei's (2023) analysis of texts as a 'collective assemblage of enunciation' (12), following Deleuze and Guattari (1987). Our research faces the contingency and movement of scientific knowledge when thinking with two theoretical paradigms, where their voices entangle and build 'a brief arrest' (Jackson & Mazzei, 2023, 12). In this engagement, we connect theoretical conceptualisations with the performative narration of a vignette.

A performative narration understands the vignette not as a representation of reality but as a causal recreation of a collectivity. In other words, 'as performative, the accounts are repetitions that do not simply repeat the past but bring something different into existence' (Jackson & Mazzei, 2023, 13). In consequence, our vignette cannot be considered as data but as an assemblage that merges agents such as the researchers, the traces of the experience in the vignette, the children's movements or the educational research (Ellingson, 2017). In this process, the vignette and its analysis contain our own material footprint and our worlding, and we are agents in the process of data co-construction. Following St. Pierre (2019), we analyse the assemblage of agents (including theoretical conceptualisations) in writing, noting its connections with the researchers and our past research, as well as their cooperation with the vignette, thereby creating a new field in educational

research (Jackson & Mazzei, 2023). The two-layered reading (cognitive and posthuman) offered in this paper enables us to zoom in on relations and interactions that are implicit in our classroom sessions with the participants and to deepen the role of the researchers who are entangled with/ through the researched materialities (MacLure, 2016).

Music on the move: two vignettes

Our vignettes recall the moment in which Edith, the teacher, carries out a musical listening activity in the classroom. The song is part of an educational toolbox she uses in the classroom, focused on the topic 'Mystery in the Museum' and consisted of a book, notebook, worksheets, songs and crafts. Through them, the children are expected to develop a series of skills and learnings.

1. What's the song about?

It is the end of January, and the children have been working with the toolbox since they came back from the Christmas holidays, three weeks before. The children have learnt this song in the previous days through listening to it, dancing and singing.

> *The children are sitting cross-legged on the cork floor of the classroom, forming the circle of the assembly (Figure 1). The teacher, Edith, announces they are going to listen to the song. Dora claps. Whispers and murmurs similar to the song reach my ears. Nigel moves his head up and down, and Julia, cross-legged, sways. Susan and other children are humming the chorus of the song. Edith asks Laura: 'How many words are in the song's title?' Before Edith finishes her question, Dora looks at her and says: 'I know the song.' 'Dora, what's the song about?' asks Edith. Silence. Fiona looks at Dora moving her finger, mouthing and swaying. Edith changes her question and asks, 'Does anybody remember the song?' Duncan exclaims 'Me, me!' When Edith gives the floor to Duncan, he starts singing the song. Edith explains with slower, emphasised words: 'I am not asking you to sing the song, but to tell us what's the song about, what happens in the song'. Duncan shrugs and says: 'Don't know'. His knees are swinging.*

2. Do not dance, we are listening to the song

Edith keeps encouraging the children to talk about the content of the song. She talks about a missing painting and a papyrus – words that are familiar to the children and that they repeat with conviction. Edith considers it necessary to listen to the song again in order to achieve the purpose of her activity.

> *'Do not dance, we are listening to the song, because I think we are not . . .'. Duncan is bouncing, cross-legged. Fiona and Dora are moving too, swinging their bodies cross-legged. Julia claps. The music starts. Dora almost stands up, with one leg in front of her. Edith says: 'We sit. Laura; we are listening to the lyrics of the song, the lyrics'. Dora's arms keep swinging. The movement gradually fades out, losing momentum. Izzy repeats 'The lyrics'. From my position on one of the children's chairs, I can see a cluster of moving knees and arms, soft voices singing. More children are joining this community of movement (Figure 2). Duncan watches Dora and Izzy move and sing on their knees. Duncan suddenly goes on his knees, singing and pointing with his fingers. Susan's moves mimic the characters and lyrics of the video. Julia's slapping on her knees follows the beat while Nigel sings the song and crawls around. Nigel and Duncan throw themselves on the floor when the song ends. Some girls discuss how to produce the finger clicks in the song.*

Figure 1. What's the song about?

Figure 2. Do not dance.

Thinking with theory in music education: an otherwise analysis

The everyday activity of listening to a song in a classroom, as the culmination of a series of activities before moving onto another set of tasks, confronted us with a twofold reading. When we (Alejandra, José and Fernando) went back to our recordings, we, as music educators, took into account different musical outputs, such as the children's coordination with music, their pitch accuracy or their rhythmic development. We also noticed their failure when they were not able to extract the meaning of the lyrics or to keep still while they listened. However, our posthuman research with this same group of children moved us to think differently and notice the material agentialities and affects emerging in the event. These simultaneous readings cohabit as diffractions in our approach to this complex event, in the same way in which they coexist in ourselves as researchers and educators.

'Paying attention' to movement, music and song: a cognitive reading

Edith's approach to the song is to listen to the lyrics without dancing. However, as the children listen to the music, they move different parts of their bodies, in line with the idea that movement is an inherent part of children's musical experience (Abril, 2011) and that music is learned in the relationship between body and mind (Philpott, 2016). Some of the children move while sitting on the floor, or sit up, or are even about to stand up. These movements are created by the children in a free and exploratory way (Abril, 2011). Through them, they display their understanding of musical discourse (rhythm, pitch, structure) (Faber, 2017), which is similar to other suggestions for the use of movement in music. Children in our vignettes show age-appropriate skills in their movements, such as clapping to the beat or developing fine psychomotor skills when clicking their fingers (Kenney, 2008). In this sense, children's movement becomes a form of active listening in which they identify rhythmic, melodic and other formal patterns (Gault, 2016).

The teacher attributes a series of utilities to the song that transcend the merely musical and seek to develop cognitive skills through musical practice. This attribution is based on the theory that 'whether children listen to the "music" of the rain, popular children's songs, or make their own musical compositions, important skills, such as reading, writing, listening, and speaking, are developed' (Paquette & Rieg, 2008, 231). Thus, Edith asks the children how many words are in the title of the song or what the song is about. However, in our vignettes, none of the children can respond adequately to Edith's questions, even when they know how to count and have already listened to the song several times in previous sessions. In this sense, although there are studies that demonstrate the benefits of music education on children's different cognitive skills (Schellenberg, 2016), Rauscher and Hinton (2011) stress that these effects are of undetermined duration, require further elaboration and should not restrict music education to only serving extra-musical cognitive development. What happens in the classroom is related to studies in which children of similar ages to ours, after a music-based intervention, improved their phonological awareness but not their ability to identify letters (Gromko, 2005), or in which the intervention on children of similar ages to ours did not show an improvement in vocabulary (Mehr et al., 2013).

The children's claim to know the song responds to their understanding of it (as seen in their movements, reactions or when Fiona mouths the song to her partner) in terms of the rhythm, tempo, melody or movements associated with the song and its lyrics (as happens to Duncan). This spontaneous response to music, even before it starts to sound, relates to musical practice as a form of meaning-making (Campbell, 2011) and to the individual and collective musical agency of the children (Karlsen, 2011). The children in our vignettes construct their understanding of music (when they say they know the song) in a holistic way, without separating the lyrics from the music, and through movement (Minton & Faber, 2016). As Philpott (2016, 198) states, 'the importance of the child's body in music literacy should come as no surprise, that is, these meaning-making processes are rooted in the dynamic body'. In this sense, Philpott (2016) claims that music is *the* paradigm of human cognition (199) in its merging of mind and body, thinking and perception.

'Interruption' as knowledge: a posthuman reading

The corked assemblage of the assembly

As we (Alejandra, José and Fernando) come back to the video recordings and rewrite the vignettes, we feel the need to consider the different relations entangled in it. Boldt (2021) sets out how a more-than-human approach allows us to rethink school spaces as assemblages and entanglements. Our event's assemblage is made up of the children, their material world, the song when they sing it or the floor, as they crawl around or slide on it. The cork floor is no longer a defined space for them to move on but an active agent in the set of relations intertwining in the classroom. We feel how it offers an invitation for Duncan and Nigel to slide on it at the end of the song, in the same way as it embraces the children as they move and sway. Accepting these

elements as an assemblage allows us to delve into the intricacy of the moment through the material (Daniels, 2021a), where human and non-human bodies are levelled.

The children-song-cork assemblage exists insofar as all its elements converge and intertwine, none of them being more important than the others. They emerge in a non-child-centred 'relation between a child and their sonic, embodied, mobile entanglements with a place – entanglements that resist the image of a sovereign human child' (Land, 2022, 74). The more-than-human desires in this assemblage (Buchanan, 2021) act on/with the children who are unable to stop moving. The human desires in the event (not to move, listening while still) cohabit and are levelled with the matter's desires (the song or the floor). Hence, we do not see the children as refusing to obey their teacher; rather, we view them as an assemblage in which the decentred children come-to-be in their interweaving with the more-than-human world.

The unpredictability of movements and agentialities in our event recalls the randomness of more-than-human bodies and affects (Hackett & Rautio, 2019). The song affects the children's bodies to the same degree as the floor or Alejandra's mobile phone's camera. The children's movements emerge in their relations with music and exist with the song, and the song comes-to-be in the children's movements. Affects vibrate and resonate in the more-than-human bodies (Gershon, 2020), triggering Fiona's movements even before the song begins. The classroom assemblage is not just the sum of its parts but the agentialities of its elements (DeLanda, 2006), their desires and affects. Reading our vignettes as an assemblage challenges a human-centred perspective, in which human beings organise the world according to their will. Music, as matter, is an agent and triggers desires and affects far beyond human intentions.

Embodied listening as thinking

Children are asked by the teacher to remain still while they listen to the song when they are told to 'listen, not to dance'. Her reminders throughout our vignettes resonate with other ways of controlling movement and with a certain way of listening ('Do not dance', 'we are listening to the song'). Edith, as part of the educational system, controls what movements are allowed in the classroom (Kirby, 2020). The permitted movements are those that do not involve the children shifting their positions, and therefore, Edith allows children to sway and to move their head or finger. Edith and Alejandra's bodies are part of this adult way of listening when they sit still and silently listen to the song. However, as the song goes on, the children's bodies challenge these rules by becoming sliders on the floor or almost-standing dancers. Each body relates to/with the music independently, with its own desires and affects, and the adult's homogeneous command is unable to grasp the network of happenstances unfolding in the assemblage. As stated by Hackett and Somerville (2017), children's embodiments become a way of being embedded in/with the world.

The aim of listening to the song without moving implies a mind/body divide that utterly defies the children's way of relating to music. As MacRae et al. (2018, 511) explain, 'when young children think in movement, the notion of intentionality does not work because firstly, thinking is happening through the body'. The children in our vignettes think through embodied movement (Fullagar, 2021), and their movements and answers to Edith are part of the same unified nature of their body–mind relations (Murris, 2016). The aims of counting words, explaining the lyrics' meaning or listening still respond to a split of the cognitive mind and the sensitive body. However, when asked about the song, Duncan answers with the song itself, embracing the tune, its lyrics and their embodiment, in which movement is the continuous state of bodies (Daniels, 2021b).

The aim of using the song for a linguistic task is therefore troubled by the consideration of 'sound, vibration and resonance (music) as part of the material experience of children' in their learning (Powell & Somerville, 2020, 845). The song is part of the onto-epistemological way of being/knowing/doing in childhood, where mind (listening) and body (moving) merge (Bowman & Powell 2007). Lyrics are always sung and embodied (Hackett, 2022), not thought out, and the

title of the song is not just a sum of words but an assemblage of melody, rhythm, phonemes and movements.

Children's deterritorialisation of adult's intentionalities

Territories are created in the classroom assemblages through reiteration, routines and rituals (Brownell, 2019). The classroom assembly is a daily-created territory where children know what to expect, and routines are dictated by the teacher and delivered to the children as oral instructions, use of spaces and furniture or visual displays. The children in this territory may be considered to be knowledge consumers waiting for instructions, questions and information. Nonetheless, the material agency of the song is intertwined with the affects and desires of the moving bodies, and joy troubles the muted territories of the school (Gershon, 2018). As Dernikos (2020) proposes, embodied affects can create lines of flight such as those in Fiona's or Duncan's movements, deterritorialising the striated spaces of the well-known. The territory of the (silent/still) listening in the assembly is deterritorialised in the assemblage of (sounding) music and movement. The expectation, murmurs and whispers when Edith announces the song, the bodies' emerging movements or Fiona's moving fingers even before the song starts to play highlight the bodies' entanglement with the imagined matter of children's embodiments (Daniels, 2021b).

The Mystery at the Museum song in the assembly territory is imbued with a pedagogical intentionality, being part of a lesson plan that finds its purpose in the school territory. The chronologically ordered tasks – listening, counting, explaining – draw on a conceptualisation of teaching in which one step leads to another, fulfilling a final aim, thereby supporting a child in need of guidance and support for their learning (Murris, 2016). However, this linearity of learning in the school's territory, based on linguistic discourse, is deterritorialised in the sounding embodiments emerging in/with the cork floor that underpins the impossibility of linear learning in early childhood (Hackett, 2021). The song, as agential matter, has become a 'willful object' (Dernikos, 2018, 6) that denies the likelihood of meaning-making in silent and still minds separated from bodies. Wilful more-than-human bodies flee alien purposes imposed on them and show, in their reluctance, the exercise of power in institutions (Ahmed, 2014). Therefore, the song, bodies and movements challenge linear learnings through their emergence and their recall of the embodied/imagined/assembled children's bodies.

The privilege given to linguistic/still/silent ways of knowledge in the school, over embodied/emergent/wilful matter, dwells in an adult/child binarism (Murris, 2016). Our reading of the event shows how the children's thinking bodies emerge in/through/with their relations with the world (Somerville & Powell, 2019). They create unexpected lines of flight that trouble human-centred mind/body binaries and human/child intentionalities. Music in our vignettes cannot be understood as a means of serving territorialised adult ends, such as listening or counting. As a material agent, music comes-to-be in the deterritorialised, more-than-human assemblage (Daniels, 2021b).

Conclusions

Paying attention to the relationality of sound, space or children invites us to rethink childhood from a material perspective that troubles an understanding of childhood from biological and psychological paradigms. In our research, a minor event is *read* from two different theoretical propositions on childhood, music learning and the school. These readings propose divergent constructs on childhood as a social, cultural and political artefact, raising issues about the limits of cognitive and developmental approaches to music and posing alternatives based on the materiality of sound and music. Our inquiry highlights different understandings of research on/with children and questions a universalising view of learning based on the assessment of skills (Malone et al., 2020). In the pursuit of alternatives to research based on cognitive and developmental propositions, posthuman

pedagogies (Snaza et al., 2016) open paths to challenge the linearity of learning and to consider how sound affects and is affected in the classroom (Dernikos et al., 2020). Posthuman pedagogies attend to an otherwise ethic-onto-epistemology (Barad, 2007) based on material relationalities that reposition children and childhood (Murris, 2016). Therefore, our research proposes posthuman pedagogies as divergent forms of understanding our event, delving into the emergence of its agents and aiming to avoid the constraints of cognitive approaches to music education.

Thinking with theory as a method for analysis (Jackson & Mazzei, 2023) implies that researchers do not know the questions or the answers beforehand. At the beginning of our inquiry, we asked ourselves about the possibilities offered by our diffractive reading of our vignette, but we were also open to unexpected answers arising as we read with theory (Jackson & Mazzei, 2023).

The relations overlooked by applying only a cognitive approach in our analysis was our first consideration. In our cognitive analysis, we explored movement as a natural reaction to music and its use as a support for developing non-musical skills, such as language. However, the children in our vignette were unable to answer their teacher's questions, and a posthuman perspective has highlighted the impossibility of separating mind and body. The song, as matter, acts in/on/with the more-than-human bodies in an unpredictable way, different for each child. These bodies include sound, the floor or the relations of children and adults, entangled in a boundless assemblage of enacted, unique and emergent agencies. Each assemblage is unique and emergent and comes-to-be in the more-than-human bodies. Teachers cannot foresee the affects and desires assembling in classroom situations, but the dismissal of these deterritorialisations ignores the ways in which children come to know music by being, knowing and doing.

Developmental cognitive approaches to music education accept movement as a natural way to experience music and to develop motor and cognitive skills. We therefore asked ourselves what our posthuman reading added to this perspective. Humanistic and cognitive theories of movement generally draw on the mind–body divide, emphasising movement as representation (Minton & Faber, 2016). A posthuman reading challenges these meaning–symbol divides in its conceptualisation of our event as an assemblage, emerging in relations, affects and desires. In an assemblage, knowledge in music is constructed through an entanglement of bodies, sound and matter. Relegating music to support other areas of learning hinders children's possibilities to discover the world and create meaning through aural sensoriality (Shannon, 2020). Therefore, we question our vignettes' adult intentionality of dividing the music discourse into sections, privileging the contents' lyrics over the tune or the embodiment. From a posthuman perspective, such a divide fails because of its neglect of the children's embodied ways to know music, where mind and body, music and lyrics, merge in an entangled form of musicianship.

Thinking with posthuman theories challenges the idea of songs as representational experiences unconnected to affects and embodiments. It also makes us wonder what may be understood as mistakes and knowledge in school music practices. As we saw in our vignettes, music's embodied knowledge does not always align with the aims of adults/teachers. In the continuous dynamic of (de)territorialisations, children's learning may flee pre-determined pedagogical goals. The song in our vignette is children's knowledge that comes-to-be in the assemblage, where adults fail in the attempt to break it down into single elements governed by a linguistic logic (Murris, 2016). Attending to sound and music as entangled with bodies and matter 'create an invitation to explore and learn in ways that are valuable and meaningful to our students' (Cooke, 2024, 315). Regarded from and adult-led cognitive and disembodied point of view, the children have not fulfilled the tasks they were set. As we move from an adult-centred and humanist lens towards a child-centred one in which children are not regarded as less human just for the mere reason of being children (Murris, 2016), we begin to consider these mistakes as world-forming. A posthuman focus on children as part of a more-than-human world enables a wider and fairer understanding of the school's practices, where the children integrate into material assemblages (Hackett, 2022). Attention to the materiality of music in the school could lead to a new curriculum, one that is

attuned to childhood ways of knowing that include otherwise ways of being/doing/knowing music (Snaza et al., 2016).

The implications of our research point to the necessity of reading music learning from different theoretical paradigms, given that the ways in which we build our conceptualisations of childhood are intimately interwoven with our pedagogical practices. Hence, our research proposes different readings on children and music in order to attend the complexity of the classroom events (Malone et al., 2020). By doing so, researching on sound and music in childhood education becomes open and unpredictable. Our posthuman perspective has enabled us to approach the otherwise ways in which children learn and build worlds as they entangle with sound and matter. In this sense, posthuman pedagogies are sensitive to learning based on material relationalities, affects, material agencies and the more-than-human assemblages that decentre the human in emergent and unpredictable events. As pointed out by Snaza et al. (2014), research on childhood should become an *open science* that facilitates the challenge to cognitive practices in education.

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References

ABRIL, C. R. (2011). Music, movement, and learning. In R. Colwell & P. Webster (eds.), *MENC Handbook of Research on Music Learning, vol. 2: Applications* (pp. 92–129). Oxford, UK: Oxford University Press.

AHMED, S. (2014). *Willful Subjects*. Durham, NC: Duke University Press.

BARAD, K. (2007). *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham, NC: Duke University Press.

BOLDT, G. (2021). Theorizing vitality in the literacy classroom. *Reading Research Quarterly*, **56**(2), 207–221.

BOROVICA, T. (2019). Dancing the strata: Investigating affective flows of moving/dancing bodies in the exploration of bodily (un)becoming. *Qualitative Inquiry*, **25**(1), 26–36.

BOWMAN, W. (2004). Cognition and the body: Perspectives from music education. In L. Bresler (ed.), *Knowing Bodies, Moving Minds. Towards Embodied Teaching and Learning* (pp. 29–50). Dordrecht, The Netherlands: Springer.

BOWMAN, W. & POWELL, K. (2007). The body in a state of music. In L. Bresler (ed.), *International Handbook of Research in Arts Education* (pp. 1087–1106). Dordrecht, The Netherlands: Springer.

BRAIDOTTI, R. (2019). A theoretical framework for the critical posthumanities. *Theory, Culture and Society*, **36**(6), 31–61.

BROWN, A. R. (2016). Engaging in a sound musicianship. In G. E. McPherson (ed.), *The Child as Musician. A Handbook for Musical Development* (2nd ed., pp. 208–220). Oxford, UK: Oxford University Press.

BROWNELL, C. J. (2019). Sound the alarm!: Disrupting sonic resonances of an elementary English language arts classroom. *Curriculum Inquiry*, **49**(5), 551–572.

BUCHANAN, I. (2021). *Assemblage Theory and Method: An Introduction and Guide*. London, UK: Bloomsbury Academic.

CAMPBELL, P. S. (2011). Musical enculturation: Sociocultural influences and meanings of children's experiences in and through music. In M. S. Barrett (ed.), *A Cultural Psychology of Music Education* (pp. 61–81). Oxford, UK: Oxford University Press.

COOKE, C. (2024). Reverberations in music education: What does sound 'do' in our learning spaces? *Music Education Research*, **26**(3), 304–317.

COYLE, Y. & GÓMEZ GRACIA, R. (2014). Using songs to enhance L2 vocabulary acquisition in preschool children. *ELT Journal*, **68**(3), 276–285.

DANIELS, K. (2021a). Notions of agency in early literacy classrooms: Assemblages and productive intersections. *Journal of Early Childhood Literacy*, **21**(4), 568–589.

DANIELS, K. (2021b). Movement, meaning and affect and young children's early literacy practices. *International Journal of Early Years Education*, **29**(1), 41–55.

DAVIS, S. G. (2016). Children, popular music, and identity. In G. E. McPherson (ed.), *The Child as Musician. A Handbook for Musical Development* (2nd ed, pp. 265–283). Oxford, UK: Oxford University Press.

DELANDA, M. (2006). *A New Philosophy of Society: Assemblage Theory and Social Complexity*. London, UK: Continuum.

DELEUZE, G. & GUATTARI, F. (1987). *A Thousand Plateaux. Capitalism and Schizophrenia*. London, UK: Continuum.

DERNIKOS, B. P. (2018). 'It's like you don't want to read it again': Exploring affects, trauma and 'willful' literacies. *Journal of Early Childhood Literacy*, **0**(0). https://doi.org/10.1177/1468798418756187.

DERNIKOS, B. P. (2020). Tuning into 'fleshy' frequencies: A posthuman mapping of affect, sound and de/colonized literacies with/in a primary classroom. *Journal of Early Childhood Literacy*, **20**(1), 134–157.

DERNIKOS, B. P., LESKO, N., MCCALL, S. D. & NICCOLINI, A. D. (2020). Feeling education. In B. P. Dernikos, N. Lesko, S. D. McCall & A. D. Niccolini (eds.), *Mapping the Affective Turn in Education. Theory, Research, and Pedagogies* (pp. 3–27). New York, USA: Routledge.

ELLINGSON, L. L. (2017). *Embodiment in Qualitative Research*. New York, USA: Routledge.

ELLINGSON, L. L. & SOTIRIN, P. (2020). *Making Data in Qualitative Research. Engagement, Ethics, and Entanglements*. New York, USA: Routledge.

FABER, R. (2017). Dance and early childhood cognition: The Isadora effect. *Arts Education Policy Review*, **118**(3), 172–182.

FULLAGAR, S. (2021). Re-turning to embodied matters and movement. In K. Murris (ed.), *Navigating the Postqualitative, New Materialist and Critical Posthumanist Terrain Across Disciplines* (pp. 117–124). Abingdon, UK: Routledge.

GALLAGHER, M. (2016). Sound as affect: Difference, power and spatiality. *Emotion, Space and Society*, **20**, 42–48.

GAULT, B. M. (2016). *Listen Up! Fostering Musicianship through Active Listening*. Oxford, UK: Oxford University Press.

GERSHON, W. S. (2018). *Sound Curriculum. Sonic Studies in Educational Theory, Method & Practice*. New York, USA: Routledge.

GERSHON, W. S. (2020). Reverberations and reverb: Sound possibilities for narrative, creativity, and critique. *Qualitative Inquiry*, **26**(10), 1163–1173.

GROMKO, J. E. (2005). The effect of music instruction on phonemic awareness in beginning readers. *Journal of Research in Music Education*, **53**(3), 199–209.

GROSZ, E. (2008). *Chaos, Territory, Art. Deleuze and the Framing of the Earth*. New York, USA: Columbia University Press.

GULLION, J. S. (2018). *Diffractive Ethnography. Social Sciences and the Ontological Turn*. New York, USA: Routledge.

GUYOTTE, K. W., FLINT, M. A., KIDD, B. G., POTTS, G. A., IRWIN, A. J. & BENNETT, L. A. (2020). Meanwhile: Posthuman intra-actions in/with a post-qualitative readings class. *Qualitative Inquiry*, **26**(1), 109–121.

HACKETT, A. (2021). *More-Than-Human Literacies in Early Childhood*. London, UK: Bloomsbury Publishing.

HACKETT, A. (2022). Beyond transparency: More-than-human insights into the emergence of young children's language. *Literacy*, **56**(3), 244–252.

HACKETT, A. & RAUTIO, P. (2019). Answering the world: Young children's running and rolling as more-than-human multimodal meaning making. *International Journal of Qualitative Studies in Education*, **32**(8), 1019–1031.

HACKETT, A. & SOMERVILLE, M. (2017). Posthuman literacies: Young children moving in time, place and more-than-human worlds. *Journal of Early Childhood Literacy*, **17**(3), 374–391.

HARGREAVES, D. & LAMONT, A. (2017). *The Psychology of Musical Development*. Cambridge, UK: Cambridge University Press.

HICKEY-MOODY, A. C. (2020). New materialism, ethnography, and socially engaged practice: Space-time folds and the agency of matter. *Qualitative Inquiry*, **26**(7), 724–732.

JACKSON, A. Y. & MAZZEI, L. A. (2023) *Thinking with Theory in Qualitative Research*. Abingdon, UK: Routledge.

KARLSEN, S. (2011). Using musical agency as a lens: Researching music education from the angle of experience. *Research Studies in Music Education*, **33**(2), 107–121.

KENNEY, S. (2008). Birth to six. *General Music Today*, **22**(1), 32–34.

KIRBY, P. (2020). Marshmallow claps and frozen children: Sitting on the carpet in the modern 'on-task' primary classroom. *Pedagogy, Culture & Society*, **28**(3), 445–461.

KOFF, S. R. (2000). Toward a definition of dance education. *Childhood Education*, **77**(1), 27–32.

KUBY, C. R. & RUCKER, T. G. (2020). (Re)Thinking children as fully (in)human and literacies as otherwise through (re)etymologizing intervene and inequality. *Journal of Early Childhood Literacy*, **20**(1), 13–43.

LAND, N. (2022). Movement belongs to all of us? Thinking interdisciplinarity with early childhood studies and kinesiology. *Journal of Pedagogy*, **13**(1), 71–87.

MACLURE, M. (2013). The wonder of data. *Cultural Studies ↔ Critical Methodologies*, **13**(4), 228–232.

MACLURE, M. (2016). The refrain if the a-grammatical child: Finding another language in/for qualitative research. *Cultural Studies ↔ Critical Methodologies*, **16**(2), 173–182.

MACRAE, C., HACKETT, A., HOLMES, R. & JONES, L. (2018). Vibrancy, repetition and movement: Posthuman theories for reconceptualising young children in museums. *Children's Geographies*, **16**(5), 503–515.

MALONE, K. (2019). Worlding with Kin: Diffracting childfish sensorial ecological encounters through moving image. *Video Journal of Education and Pedagogy*, **4**(1), 69–80.

MALONE, K. & MURRIS, K. (2022). Worlding. In K. Murris (ed.), *A Glossary for Doing Postqualitative, New Materialist and Critical Posthumanist Research Across Disciplines* (pp. 144–145). Abingdon, UK: Routledge.

MALONE, K., TESAR, M. & ARNDT, S. (2020). *Theorising Posthuman Childhood Studies*. Singapore, Singapore: Springer.

MANNING, E. (2014). Wondering the world directly – or, how movement outruns the subject. *Body & Society*, **20**(3–4), 162–188.

MARTÍN ESCOBAR, M. J. (2005). Del Movimiento a la Danza en la educación musical. *Educatio Siglo XXI*, **23**, 125–140.

MEHR, S. A., SCHACHNER, A., KATZ, R. C. & SPELKE, E. S. (2013). Two randomized trials provide no consistent evidence for nonmusical cognitive benefits of brief preschool music enrichment. *PLoS ONE*, **8**(12), e82007.

MINTON, S. C. & FABER, R. (2016). *Thinking with the Dancing Brain. Embodying Neuroscience*. Lanham, Maryland, USA: Rowman & Littlefield.

MULLEN, G. (2015). More than words: Using nursery rhymes and songs to support domains of child development. *Journal of Childhood Studies*, **42**(2), 42–53.

MURRIS, K. (2016). *The Posthuman Child. Educational Transformation Through Philosophy with Picturebooks*. London, UK: Routledge.

MURRIS K. & BOZALEK, V. (2019). Diffraction and response-able reading of texts: The relational ontologies of Barad and Deleuze. *International Journal of Qualitative Studies in Education*, **32**(7), 872–886.

PAHL, K., STEADMAN-JONES, R. & VASUDEVAN, L. (2022). *Collaborative Research in Theory and Practice. the Poetics of Letting Go*. Bristol, UK: Bristol University Press.

PAQUETTE, K. R. & RIEG, S. A. (2008). Using music to support the literacy development of young English language learners. *Early Childhood Education Journal*, **36**(3), 227–232.

PARR, A. (2010). *The Deleuze Dictionary*. Edinburgh, Scotland: Edinburgh University Press.

PERRY, M. & MEDINA, C. L. (2015). *Methodologies of Embodiment. Inscribing Bodies in Qualitative Research*. New York, USA: Routledge.

PHILPOTT, C. (2016). Music literacy: Music as language. In G. E. McPherson (ed.), *The Child as Musician. A Handbook for Musical Development* (2nd ed., pp. 192–207). Oxford, UK: Oxford University Press.

POWELL, S. & SOMERVILLE, M. (2020). Drumming in excess and chaos: Music, literacy and sustainability in early years learning. *Journal of Early Childhood Literacy*, **20**(4), 839–861.

RAUSCHER, F. H. & HINTON, S. C. (2011). Music instruction and its diverse extra-musical benefits. *Music Perception*, **29**(2), 215–226.

SCHELLENBERG, G. E. (2016). Music and non-musical abilities. In G. E. McPherson (ed.), *The Child as Musician. A Handbook for Musical Development* (2nd ed., pp. 149–176). Oxford, UK: Oxford University Press.

SCHRADER, A. (2023). Diffraction as cross-disciplinary methodology between science and arts. In A., Bayley & J., Chan (eds.), *Diffracting New Materialisms: Emerging Methods in Artistic Research and Higher Education* (pp. 15–40). Cham, Switzerland: Palgrave Macmillan.

SHANNON, D. B. (2020). Neuroqueer(ing) noise: beyond 'mere inclusion' in a neurodiverse early childhood classroom. *Canadian Journal of Disability Studies*, **9**(5), 489–514.

SLATER, J., TIERNEY, A. & KRAUS, N. (2014). At-risk elementary school children with one year of classroom music instruction are better at keeping a beat. *PLoS ONE*, **8**(10), e77250.

SNAZA, N., APPELBAUM, P., BAYNE, S., CARLSON, D., MORRIS, M., ROTAS, N., SANDLIN, J., WALLIN, J. & WAVER, J. (2014). Toward a posthumanist education. *Journal of Curriculum Theorizing*, **30**(2), 39–55.

SNAZA, N. & SONU, D. (2016). Borders, bodies, and the politics of attention. In N. Snaza, D. Sonu, S. E. Truman & Z. Zaliwska (eds.), *Pedagogical Matters. New Materialisms and Curriculum Studies* (pp. 29–42). New York, USA: Peter Lang.

SNAZA, N., SONU, D., TRUMAN, S. E. & ZALIWSKA, Z. (2016). Introduction. Re-attuning to the materiality of education. In N. Snaza, D. Sonu, S. E. Truman & Z. Zaliwska (eds.), *Pedagogical Matters. New Materialisms and Curriculum Studies* (pp. xvi–xxxiii). New York, USA: Peter Lang.

SOMERVILLE, M. & POWELL, S. (2019). Thinking posthuman with mud: And children of the Anthropocene. *Educational Philosophy and Theory*, **51**(8), 829–840.

ST. PIERRE, E. A. (2019). Post qualitative inquiry in an ontology of immanence. *Qualitative Inquiry*, **25**(1), 3–16.

WARGO, J. M. (2018). Earwitnessing (in)equity: Tracing the intra-active encounters of 'being-in-resonance-with' sound and the social contexts of education. *Educational Studies*, **54**(4), 382–395.

WIENS, K. F. (2015). Music, movement and the brain. *Canadian Music Educator*, **57**(1), 34–37.

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