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Exceptional Measures: Education through Music for Children on the Autism Spectrum

1. Setting the scene: three scenarios

Romy

I spend around 12 hours a week – every week – sharing thoughts, feelings, new ideas, reminiscences and even jokes with some very special children who have extraordinary musical talents, and many of whom are severely autistic. The children come to see me in a large practice room in the University of Roehampton, London, where there are two pianos, so we don't have to scrap over personal space. My pupils usually indicate what piece they would like us to play together, and they tell me when they've had enough. Sometimes, they tease me by seeming to suggest one thing when they mean another. We share many jokes and the occasional sad moment too.

But the children rarely say a word. They communicate everything through their playing. For them, music is a proxy language.

On Sunday mornings, at 10.00 a.m., I steel myself for Romy's arrival. I know that the next two hours will be an exacting test of my musical mettle. Yet Romy, aged 11, has severe learning difficulties, and she doesn't speak at all. She is musical to the core, though: she lives and breathes music – it is the very essence of her being. With her passion comes a high degree of particularity: Romy knows *precisely* which piece she wants me to play, at what tempo and in which key. And woes betide me if I get it wrong.

When we started working together, four years ago, mistakes and misunderstandings occurred all too frequently, since (as it turned out), there were very few pieces that Romy would tolerate: the theme from *Für Elise* (never the middle section), for example, the Habanera from *Carmen*, and some snippets from *Buckaroo Holiday* (the first movement of Aaron Copland's *Rodeo*). Romy's acute neophobia meant that even one note of a different

piece would evoke shrieks of fear-cum-anger, and the session could easily grow into an emotional conflagration.

So gradually, gradually, over weeks, then months, and then years, I introduced new pieces – sometimes, quite literally, at the rate of one note per session. On occasion, if things were difficult, I would even take a step back before trying to move on again the next time. And, imperceptibly at first, Romy's fears started to melt away. The theme from Brahms's *Haydn Variations* became something of an obsession, followed by the slow movement of Beethoven's *Pathétique* sonata. Then it was Joplin's *The Entertainer*, and *Rocking All Over the World* by Status Quo.

Over the four years, Romy's jigsaw box of musical pieces – fragments ranging from just a few seconds to a minute or so in length – has filled up at an ever-increasing rate. Now it's overflowing, and it's difficult to keep up with Romy's mercurial musical mind: mixing and matching ideas in our improvised sessions, and even changing melodies and harmonies so they mesh together, or to ensure that my contributions don't!

As we play, new pictures in sound emerge and then retreat as a kaleidoscope of ideas whirls between us. Sometimes a single melody persists for 15 minutes, even half an hour. For Romy, no matter how often it is repeated, a fragment of music seems to stay fresh and vibrant. At other times, it sounds as though she is trying to play several pieces at the same time – she just can't get them out quickly enough, and a veritable nest of earworms wriggle their way onto the piano keyboard. Vainly I attempt to herd them into a common direction of musical travel.

So here I am, sitting at the piano in Roehampton, on a Sunday morning in mid-November, waiting for Romy to join me (not to be there when she arrives is asking for trouble). I'm limbering up with a rather sedate rendition of the opening of Chopin's *Etude* in C major, Op. 10, No. 1, when I hear her coming down the corridor, vocalising with increasing fervour. I feel the tension rising, and as her father pushes open the door, she breaks away from him, rushes over to the piano and, with a shriek and an extraordinarily agile sweep of her arm, elbows my right hand out of the way at the precise moment that I was going to hit the D an octave above middle C. She usurps this note to her own ends, ushering in her favourite Brahms-Haydn theme. Instantly, Romy smiles, relaxes and gives me the choice of moving out of the way or having my lap appropriated as an unwilling cushion on the piano stool. I choose the former, sliding to my left onto a chair that I'd placed earlier in readiness for the move that I knew I would have to make.

I join in the Brahms, and encourage her to use her left hand to add a bass line. She tolerates this up to the end of the first section of the theme, but in her mind she's already moved on, and without a break in the sound, Romy steps onto the set of *A Little Night Music*, gently noodling around the introduction to *Send in the Clowns*. But it's in the wrong key – G instead of E flat – which I know from experience means that she doesn't *really* want us to go into the Sondheim classic, but instead wants me to play the first four bars (and only the

first four bars) of Schumann's *Kleine Studie* Op. 68, No. 14. Trying to perform the fifth bar would in any case be futile since Romy's already started to play ... now, is it *I am Sailing* or *O Freedom*. The opening ascent from D through E to G could signal either of those possibilities. Almost tentatively, Romy presses those three notes down and then looks at me and smiles, waiting, and knowing that whichever option I choose will be the wrong one. I just shake my head at her and plump for *O Freedom*, but sure enough Rod Stewart shoves the *Spiritual* out of the way before it has time to draw a second breath.

From there, Romy shifts up a gear to the *Canon in D* – or is it really Pachelbel's masterpiece? With a deft flick of her little finger up to a high A, she seems to suggest that she wants *Streets of London* instead (which uses the same harmonies). I opt for Ralph McTell, but another flick, this time aimed partly at me as well as the keys, shows that Romy actually wants Beethoven's *Pathétique* theme – but again, in the wrong key (D). Obediently I start to play, but Romy takes us almost immediately to A flat (the tonality that Beethoven originally intended). As soon as I'm there, though, Romy races back up the keyboard again, returning to Pachelbel's domain. Before I've had time to catch up, though, she's transformed the music once more; now we're hearing the famous theme from Dvorak's *New World Symphony*.

I pause to recover my thoughts, but Romy is impatiently waiting for me to begin the accompaniment. Two or three minutes into the session, and we've already touched on 12 pieces spanning 300 years of Western music and an emotional range to match.

Yet here is a girl who in everyday life is supposed to have no 'theory of mind' – the capacity to put herself in other people's shoes and think what they are thinking. Here is someone who is supposed to lack the ability to communicate. Here is someone who functions, apparently, at an 18-month level.

But I say here is a joyous musician who amazes all who hear her. Here is a girl in whom extreme ability and disability coexist in the most extraordinary way. Here is someone who can reach out through music and touch one's emotions in a profound way. If music is important to us all, it is truly the lifeblood of many children with autism.¹

Freddie

"Why's he doing that?" Freddie's father sounded more than usually puzzled by the antics of his son. After months of displacement activity, Freddie, 11 years old and on the autism spectrum, was finally sitting next to me at the piano, and looked as though this time he really were about to play. A final fidget and then his right hand moved towards the keys. With infinite care, he placed his thumb on middle C as he had watched me do before – but without pressing it down. Silently, he moved to the next note (D), which he feathered in a similar way, using his index finger, then with the same precision he touched E, F and G, before

¹ The full text was first published on <http://blog.oup.com/2012/12/music-proxy-language-autistic-children/> [10.08.2015].

coming back down the soundless scale to an inaudible C. I couldn't help smiling. "Fred, we need to hear the notes!" My comment was rewarded with a deep stare, right into my eyes. Through them, almost. It was always hard to know what Freddie was thinking, but on this occasion he did seem to understand and was willing to respond to my request, since his thumb went back to C. Again, the key remained unpressed, but this time he *sang* the note (perfectly in tune), and then the next one, and the next, until the five-finger exercise was complete. In most children (assuming that they had the necessary musical skills), such behaviour would probably be regarded as an idiosyncratic attempt at humour or even mild naughtiness. But Freddie was being absolutely serious and was pleased, I think, to achieve what he'd been asked to do, for he had indeed enabled me to hear the notes!



Figure 1: Freddie picks out a note on the piano.
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He stared at me again, evidently expecting something more, and without thinking I leant forward. "Now on this one, Fred", I said, touching C sharp. Freddie gave the tiniest blink and a twitch of his head, and I imagined him, in a fraction of a second, making the necessary kinaesthetic calculations. Without hesitation or error, he produced the five-finger exercise again, this time using a mixture of black and white notes. Each pressed silently. All sung flawlessly. And then, spontaneously, he was off up the keyboard, beginning the same pentatonic pattern on each of the twelve available keys. At my prompting, Freddie re-ran the sequence with his left hand – his unbroken voice hoarsely whispering the low notes.

So logical. Why bother to play the notes if you know what they sound like already? So apparently simple a task, and yet ... such a difficult feat to accomplish: the whole contradiction of autism crystallized in a few moments of music making.

As I later said to Freddie's father, if I had to teach a 'neurotypical' child to do what his son had so effortlessly achieved, it would take years of effort and hundreds of hours of practice to get to grips with the asymmetries of the Western tonal system and their relationship to the quirky layout of piano keyboard. Yet Freddie had done it unthinkingly, just by observing me play, hearing the streams of notes flowing by, extracting the underlying rules of Western musical syntax, and using these to create patterns of sounds afresh. I had *never played* the full sequence of scales that Freddie produced. He had worked out

the necessary deep structures intuitively, merely through exposure to the language of music. Viva Chomsky!

So how did this child – by all accounts with a severe learning disability – do it? I contend that it was Freddie's *inability* to process language in his early years, coupled with his *inability* to ascribe functional meaning to everyday sounds that led to his heightened *ability* to process all sounds in a musical way. One traded off the other. In fact, without the former, it is almost certain that the latter would never have developed. His disabilities and abilities are, I believe, different sides of the same coin.²

Derek

After many hours of the same dull drone – auditory chewing gum that has long since lost its flavour or interest – there is a sudden, almost imperceptible change in the humming of the plane's engines. I glance outside and see that, at last, we are over the Nevada desert. Only an hour or so now until we hit Los Angeles. The man sitting next to me – noticeably upright in his seat – stiffens slightly as he hears the tiny deviation in sound. "F sharp", he intones. "It's F sharp, Adam." He leans towards me, demanding a response, and the sun bounces off his trademark Prada sunglasses, but without penetrating the world of darkness beneath. "Yes, Derek", I reply, "We'll soon be landing at LAX."

"Landing at LAX", he echoes, apparently relishing the sound of the words – and their import – in equal measure. "And I will see Dana, and I will play the piano", he continues. "Yes, Derek." I offer the same reply again, the sound of my voice as much as the words offering a reassurance forged in a relationship spanning 28 years – as Derek's teacher, mentor and friend. "You'll play the piano." Repetition confers calm, a hint of a smile crosses Derek's features, and he relaxes back in his seat.

Derek Paravicini – blind autistic savant, musician extraordinaire, learning disabled genius, unflagging companion – is on his way to California to perform in a series of concerts: grist to his globe-trotting mill. For him, aeroplanes are one of life's many mysteries: a series of awkward slopes and steps to be negotiated; well-meaning helping hands; a waft of warm, stale air; "doors to automatic and cross-check"; the sound of the engines starting up. Soon the seat seems to move and bump about, then steadiness; a long, vibrating steadiness. *Les Mis* on the headphones – once, twice, three times?

At last, everything goes into reverse, and abruptly, we're off the plane. Now there are new voices, new accents. A new hotel. Oatmeal instead of porridge for breakfast. And ... finally ... the piano. At last, something familiar. Every note a close friend. The band plays the same as in England. The clapping is familiar too, though people seem to clap louder in America.

² The full text was first published on http://www.huffingtonpost.com/adam-ockelford/autism-genius_b_4118805.html [10.08.2015].

“Good job, Derek!”, “Awesome!”, “Can you smile for the photo?” Derek wrinkles his nose, and everyone laughs, infectiously. He catches the humour, and smiles as well. Music has worked its magic, as it always does. Derek’s puzzling mixture of abilities and needs may be extreme, but spikey profiles like his are almost the norm among children and young people on the autism spectrum. And for around 5% of those with severe autism, music may be the key to unlock communication, shared attention and emotional understanding. Music may be important for all of us, but for those on the autism spectrum, it is nothing less than essential brain food.”³

2. Reflections

Why do Romy, Freddie and Derek (and, indeed, around 5–10% of people on the autism spectrum) process sound in such a different way from most people? My contention is that this is due to the ‘exceptional early cognitive environment’ (an ‘EECE’) that autism incurs,⁴ in which musical skills are particularly likely to flourish. That is *not* to say, of course, that a significant number of severely autistic children are likely to become publicly-recognised musicians, performing or composing at a high level within their culture (although some, like Derek, may). However, I do believe that where exceptional musical interests or abilities are to be found (and research from the *Sounds of Intent* project – see, for example, Vogiatzoglou, Ockelford, Welch and Himonides, 2011 – suggests that these are far more widespread than is generally recognised among the population of autistic children, often masked by unconventional behaviours), they should be nurtured, potentially offering both a source of enormous pleasure and fulfilment in their own right, as well as having the capacity to promote wider learning and development, and wellbeing.

At the core of the EECE theory is an ‘ecological’ model of auditory development (cf. Gaver 1993; Clarke 2005; Miller & Ockelford 2005), which acknowledges that there are three distinct ways in which we hear sounds, according to whether they pertain to speech, music or the environment (see Figure 2, page XX).

These three strands of auditory processing emerge as audition develops in the first year or so of life. But for some children who are on the autism spectrum, it appears that either everyday sounds, or language, or both become processed, to a greater or lesser extent, *as music* (Figure 3).

³ The full text was first published on <http://www.jkp.com/jkpblog/2013/04/music-language-autism/> [10.08.2015].

⁴ See Ockelford (2013b).

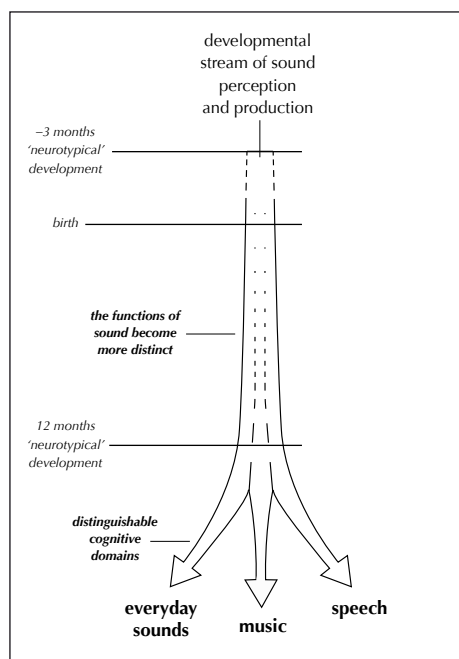


Figure 2: Three-strand model of the functional processing of sound in early development

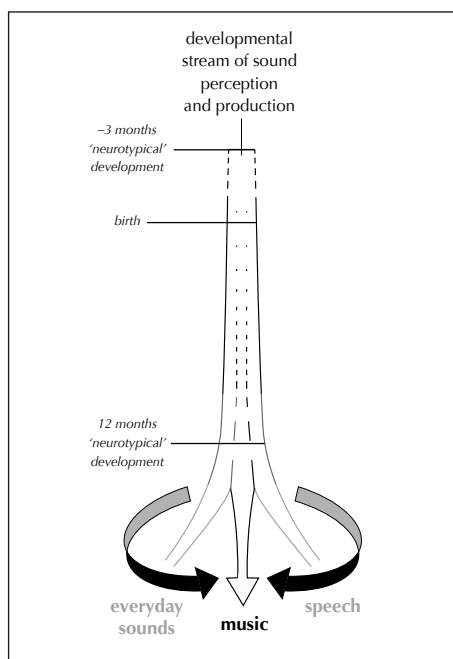


Figure 3: Everyday sounds and speech may be processed in musical terms by some children on the autism spectrum

Evidence that autistic children may attach particular importance to everyday sounds (and that, in some cases, auditory perceptual skills may become heightened in this domain) comes from my studies of young people on the spectrum. For example, Jack (aged 8) is obsessed with the sound of the microwave. According to his mother, he can't bear to leave the kitchen until it has stopped. And more recently, he has become very interested in the tumble-drier too (Ockelford 2013b, p. 13). Then there are Freddie's flowerpots. When I first met Freddie (who features in the second scenario above), he was nine years old, and indulged in a range of pursuits that bemused his parents, including habitually flicking any resonant objects that were within reach, and, one day, removing the 20 flowerpots or so (and their contents) from the patio and bringing them into the kitchen. Freddie arranged these on all available surfaces, like some earthenware gamelan, and he ran around gleefully, playing his newly-constructed instrument with characteristic flicks of the fingers. Woe betide his mother if she tried to tidy the pots up, shifting any of them by even the smallest degree, while Freddie was at school! The slightest rearrangement would instantly be noticed and rectified on his return (Ockelford, *ibid.*).

What is happening here? Why is it that some everyday auditory information remains at the perceptual level, rather than acquiring a functional gloss: the whirr of the tumble-drier, the hum of the vacuum cleaner and the chink of flowerpots persisting as ends in

themselves, as perceptual experiences to be relished, rather than portending dry laundry or a clean carpet? One reason may be difficulties with 'sensory integration' – that is, the process by which we typically link incoming data from different sensory modalities (see, for example, Iarocci and McDonald 2006). That is, the processes through which incoming streams of perceptual information in the domains of sight, sound, touch, smell and taste (as well as balance and proprioception) are typically bound together to produce single, coherent experiences and concepts, appear not to be fully functional. One can speculate that this cognitive anomaly is linked to 'weak central coherence' (Frith & Happé 1994; Happé 1996; Happé & Booth 2008) in which there is a tendency to focus attention on parts of things rather than wholes. So, a child on the autism spectrum may find it difficult to connect information both within and between sensory channels. Yet it is when things are perceived holistically that their functionality may become apparent.

There can be a further consequence of EECs, pertaining to language: 'echolalia'. This feature of speech is widely reported among autistic children, and was originally defined as the (apparently) meaningless repetition of words or groups of words. Echolalia can occur immediately after the language in question has been heard, or its reoccurrence may be delayed. Prizant and Duchan (1981) were among the first to observe that echolalia actually can fulfil a range of functions in verbal interaction, such as turn-taking and affirmation, and often finds a place in non-interactive contexts too, where it can serve as a self-reflective commentary or rehearsal strategy.

Why does echolalia occur? It is a feature of normal language acquisition in young children (one to two years old), when the urge to imitate what they hear outstrips semantic understanding. My 'zygonic' theory of music-structural understanding (for example, Ockelford 2005, 2013a) holds that imitation lies at the heart of musical structure, so one could argue that echolalia is the organisation of language (in the absence of semantics and linguistic syntax) through musical structure. It is as though the words (bearing little or no meaning) become musical objects, to be manipulated purely through their sounding qualities. Indeed, there is evidence that children on the autism spectrum pay greater attention to the prosody (specifically the 'melodic contour' of speech) than their neurotypical peers (Järvinen-Pasley, Wallace, Ramus, Happé & Heaton 2008).

It is worth noting that even music can become 'super-structured' with additional repetition; it is common for children on the autism spectrum to play snippets of music (or videos with music) over and over again as the following parent's account shows:

"Why does Ben want to listen to the jingles he downloads from the internet all the time? And I mean, the whole time – 16 hours a day if we let him. He doesn't even play them all the way through: sometimes just the first couple of seconds of a clip, over and over again. He must have heard them thousands of times. But he never seems to get bored." (Ockelford 2013b, p. 13)

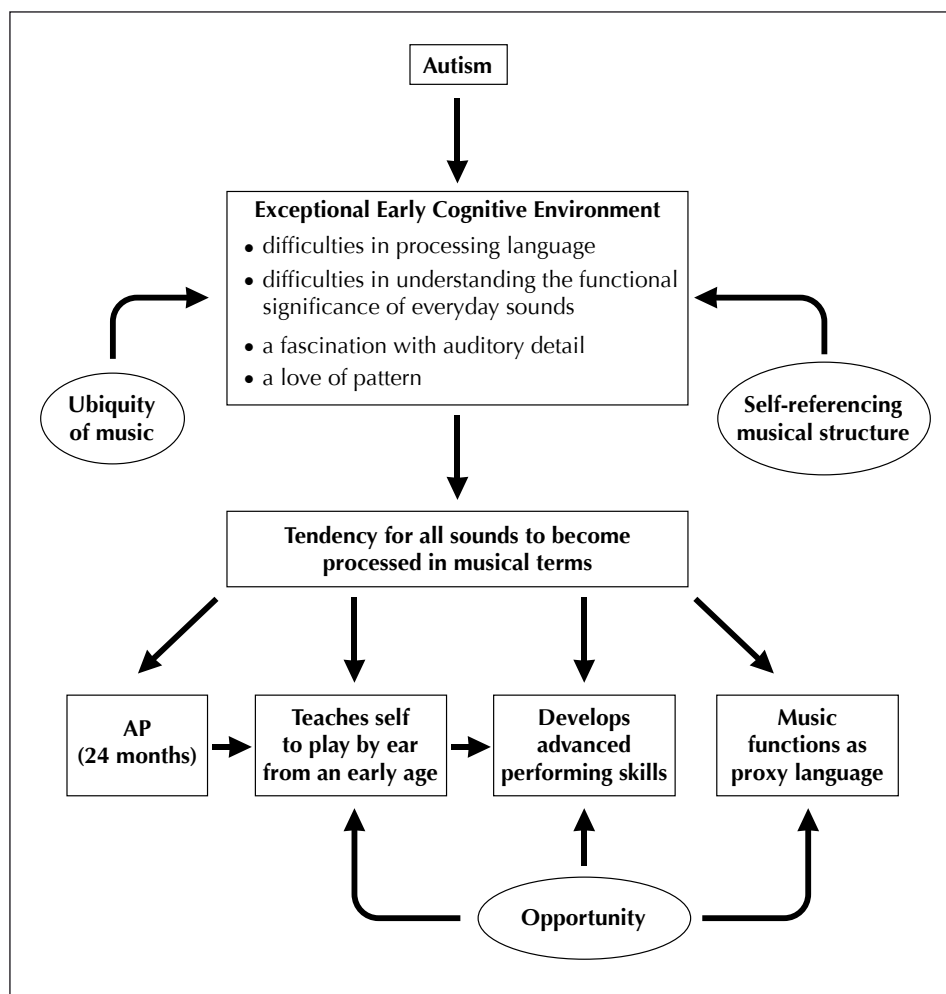


Figure 4: The supposed impact of ‘exceptional early cognitive environments’ caused by autism on musical and wider auditory development.

It is as though music’s proportion of repetition (estimated to be 80%; see Ockelford 1999) is insufficient for the mind with a voracious appetite for structure, and so it creates even more. Speaking to autistic adults who are able to verbalise why (as children) they would repeat musical excerpts in this way, it appears that the main reason (apart from the sheer enjoyment of hearing a particularly fascinating series of sounds again and again) is that they could hear more and more in the excerpt to which they were attending. Given that most music is highly complex, with many events occurring simultaneously (and bearing in mind that even single notes generally comprise many pitches in the form of harmonics), to the child with finely tuned auditory perception, there are in fact many different things

to attend to in even a few seconds of music, and many relationships between sounds to discern. While listening to a passage a hundred times may be extremely tedious to the 'neurotypical' ear, which can detect, say, only half a dozen composite events, each fused in perception, to the mind of the autistic child, which can break down the sequence into a dozen different melodic lines, the stimulus may be spellbinding. When we add music's self-referencing structure (Ockelford 2013a) to the ubiquity of music in a child's environment (Lamont 2008), everything is in place for EECs to develop. The elements in such development are modelled in Figure 4.

It will be seen that one of the consequences of other-than-musical sounds being processed as music is 'AP', or 'absolute pitch'. This is the facility to recognise and re-create individual notes without reference to another (known) pitch. As we shall see, the musical implications of this ability are dramatic: for example, to a child with AP, all 88 notes on the piano sound not just 'high' or 'low' or somewhere in between, but fundamentally different – each like a special friend with a unique character. Typically, AP is in place by 24 months, at which age children are unlikely to have learnt the verbal labels associated with each note (in English, C, D, E flat, F sharp, and so on), but these percepts are distinct nonetheless. For the 5–10% of children on the autism spectrum who develop AP, music has an added aesthetic dimension, a richness and interest – an allure that draws them irresistibly to this most abstract of art-forms.

3. The potential consequences of EECs for the development of music performance skills

Most children commence the journey of learning an instrument in ignorance of what it entails, at the behest of their parents or teachers. In the Western classical tradition, the pedagogical approach with which pupils are likely to be confronted is dominated by the belief that children should, from the outset, learn to decode notation, which is seen as an essential element of musicianship. Hence, for most pupils, the eye leads the ear. In fact, the majority of children taught through traditional means never do learn to play by ear and are imprisoned by the stave, unable to play without dots on a page telling them more or less precisely what to do.

However, for the great majority of children on the autism spectrum with AP, the opposite situation prevails: the ear leads the eye and the hand. I believe it is their absolute pitch perception that drives them towards playing any instruments that they may find at home, in the nursery or at school – typically the keyboard or piano – something that very often occurs with no adult intervention. To quote from a lecture given by Francesca Happé

at the Royal Society in London⁵, it is the autistic child's eye for detail (in this case, *ear* for detail) that kick-starts the special talents shown by many of them. I would go further and say AP is the fire that fuels the acquisition of special skills in the domain of music. Here, we consider how the kick-starting and the subsequent fuelling of proactive musical engagement work.

Consider a 'neurotypical' child – Alfie – singing a playground chant, which he repeats from time to time, though not always starting on the same note (see Figure 5). That is



Figure 5: Alfie's chant

to say, he has encoded and memorised the melodic motifs not as individual pitches in their own right, but as a series of intervals between them.⁶

However, for children such as Romy (mentioned above), who has AP, the position is somewhat different, since she has the capacity to encode the pitch data from music directly, rather than as a sequence of intervals. So in seeking to remember and repeat groups of notes over significant periods of time, she has a processing advantage over Alfie, since he has to extract and store information at a higher level of abstraction.

I believe that it is this that explains why children on the autism spectrum with AP are able to develop instrumental skills at an early age with no formal tuition, since for them, reproducing groups of notes that they have heard is merely a question of remembering a series of one-to-one mappings between given pitches as they sound and (typically) the keys on a keyboard that produce them. These relationships are fixed: once learnt, they service a lifetime of music making, through which they are constantly reinforced. Were Alfie to try to play by ear, though, he would have to master the far more complicated process of calculating how the intervals that he hears in his head map onto the distances between keys, which, due to the asymmetries of the keyboard, are likely to differ according to his starting point. For example, producing the interval between the first two notes of Alfie's song, a minor 3rd, can be achieved through 12 distinct key combinations, comprising one of four underlying patterns. Even more confusing, though, virtually the same physical leap between keys may sound different (a major 3rd) according to its position on the keyboard (see Figure 6).

⁵ On 26th October 2011, entitled: 'When will we understand autism spectrum disorders?'

⁶ We can surmise, though, that absolute representations of pitch are not entirely absent for Alfie, since the notes he uses on separate occasions are broadly similar.

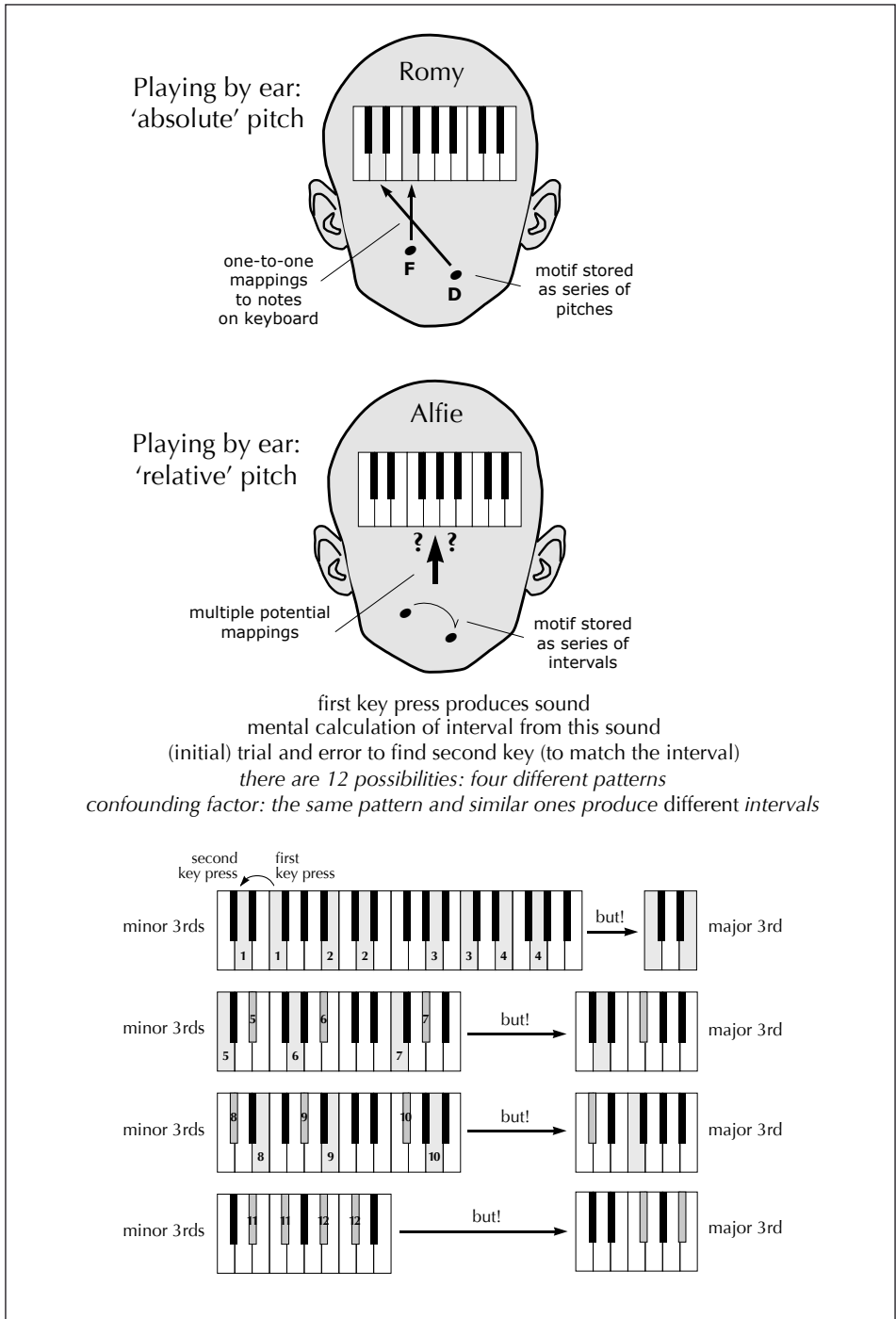


Figure 6: Different mechanisms involved in playing by ear using 'absolute' and 'relative' pitch abilities.

There seems to be little doubt that the possession of AP offers a huge advantage to the musical development of children with autism and learning difficulties, for whom many of the more conventional ways of learning (through emulating peers working in social groups or through being taught using notation, for example) may not be available. In short, AP may well enable children to function at a higher musical level than they would otherwise be able to do so, and, beyond this, it is AP that catalyses the exceptional achievement found in musical savants.

Consider, for example, Derek Paravicini (the subject of the third case study that opens this chapter). He is blind, autistic and has severe learning difficulties (see <http://www.derekparavicini.net>). I began teaching him at the age of five, by which time he had already started to teach himself to play the piano (he began at the age of two), and had developed what could best be described as an unorthodox technique, that not only involved his finger tips, but also his knuckles, elbows and even, on occasion, a judicious dip of his nose. The main melodic line was typically placed in the middle of the texture and picked out with the thumbs, giving it a characteristic percussive prominence. While technical idiosyncrasies such as these are ultimately neither 'right' nor 'wrong', certain methods of playing undoubtedly enable performers to fulfil their musical aims more effectively than others – indeed, some passages on the piano may even be rendered impossible unless a particular fingering is adopted. However, the prospect of changing aspects of a child's technique, which may have evolved wholly intuitively, can be daunting too. Those with severe autism may have little capacity to reflect consciously on what they do, and lack the receptive vocabulary to make description or analysis of their efforts meaningful. In circumstances such as there, teachers may opt for compromise: seeking to modify a pupil's technique only where it is judged to be essential; adopting, where appropriate, an evolutionary rather than a radical approach to change; and, in a positive way, acknowledging and accepting the effects on performance – technically, stylistically and in terms of repertoire – that a child's attitude to playing (and being taught) may have.

In fact, it is likely that teaching may have to rely more on demonstration than explanation. This may be based on the pupil seeing, feeling or listening to what is going on, or a combination of the three. Listening, and seeking to emulate the quality of sound made by the teacher or other performers may be a crucial factor in technical development too, since the pupil's desire to reproduce what is heard may encourage the necessary motor activity without needing conscious attention. Whatever approach is adopted, the development of technique is likely to require many hours of painstaking work on the part of both teacher and pupil. For example, as a little boy, Derek tended to play passages of consecutive notes by jumping from one to the next using the same finger – or sometimes even a series of karate chops with the side of his hand. Despite the extraordinary dexterity this entailed, it was clear that his playing would benefit enormously from incorporating the standard finger patterns associated with scales and arpeggios.

Children on the autism spectrum can perform with others more or less successfully, according to their levels of musical, cognitive and social development. They may show varying degrees of sensitivity to the fluctuating dynamics of a performing group. Some may be able to conceptualise and assume distinct roles; at different times consciously accompanying, for example, or taking the lead. The strong sense of individuality of some young people may mean that they will always be more suited to solo performance. The greatest challenge in ensembles may be working together and making decisions using little or no language. Even relatively straightforward instructions such as 'play the final chorus twice' may have to be conveyed in purely musical terms. For example, an additional dominant 7th harmony may indicate that more is to come, whereas a slight slowing may show that the end is approaching.

For those teaching children on the autism spectrum, playing in concerts is likely to raise a number of practical questions, such as attendance at rehearsals, setting up instruments and behaving appropriately on stage. It is essential that these areas of potential concern are acknowledged in good time and adequately addressed. Other issues, such as facing the audience, learning not to move excessively while playing, and receiving applause appropriately may need special consideration – and rehearsal – too. A child who is severely autistic may find it far more difficult to raise or lower the piano stool than to play the instrument once seated!

Finally, we consider a question that I am often asked in relation to music-making by children on the autism spectrum: do they *feel* the music in the same way as their 'neuro-typical' peers? This is a complex issue. Consider, for instance, the case of Milán, a teenager on the autism spectrum and with severe developmental delay, who is lead singer in his pop group at school. When he performs *Thank You for the Music* by ABBA, he slows down before the return of each chorus for expressive effect. As Milán normally displays little or no emotion in everyday life, his teacher questions whether he actually understands the music on an emotional level and, if so, whether it is this affective engagement that drives the change of tempo; or (his teacher wonders) is it merely a device that Milán has copied unthinkingly from Agnetha Fältskog's performance with ABBA that he has accessed on YouTube. Evidence for the latter view comes from the fact that, although Milán uses similar conventions of Western musical expression in other songs, they always appear to match recordings that he has heard rather closely. And, as far as his teacher is able to ascertain, Milán does not transfer the interpretative gestures he reproduces in one context to novel scenarios.

Other performers, such as Derek, in whom it is similarly possible to discern only a limited range of emotions in day-to-day life, seem to have taken the next step. He has learnt the 'emotional syntax' of expressive performance in a range of styles with which he is familiar: that is, he has acquired a repertoire of expressive devices that he can apply to new music in a rule-based way at appropriate points that are have the capacity to communicate different feelings in those who listen to his playing. For example in the documentary

about him, *The Musical Genius* (originally screened in 2005 on Channel 5 in the UK and Discovery Health in the US), I created a short sequence of chords on the computer that, in terms of performance, were devoid of any expressivity at all. However, in conversation with the music psychologist John Sloboda, Derek showed that he was able to convey different emotions (joy, sorrow and – least convincingly – anger) through improvising on the series of chords in different ways, which included the introduction of expressive devices (such as changes in dynamics and tempo) as well as structural alterations (including the introduction of the minor key).

On viewing the programme, a number of people have asked the same question that Milán's teacher was keen to have answered, to the effect of: 'Derek may be able to convey emotion in his playing (he has evidently learnt the "code" of expressive performance), but does he *feel* it himself?' Since Derek has very limited powers of metacognition, this issue is currently unresolved. However, there are two points that I think are worth making in this regard. The first is, does it matter? Derek loves playing *for other people* (he rarely, if ever, plays at his own instigation for his own amusement), and since his performances bring him and his audience pleasure, is it essential to have a precisely shared message? Or is the fact that positive communication takes place (even if the message as transmitted and received is somewhat different) the important thing? This highlights an issue that is problematic for all performers: since music exists only in the ear of the beholder so, by definition, does musical *meaning*, and it is inevitable that in any live musical engagement, performers and members of the audience will experience subtly (even, on some occasions, radically) different things. The second point is that Derek, and others like him, may come to learn about their own feelings *through music*, which they may then recognise in everyday life (rather than via the more common route of experiencing reactions to people and events, which are subsequently felt to be conveyed by music). Such responses may occur directly, as when Derek *feels* emotion as he listens to music (just as 'neurotypical' listeners do), or indirectly: for example, when he performs with others, and detects a communicative intent in the way they play or sing – an intent that may be confirmed verbally (cf. Emanuele, Boso, Cassola, Broglio, Bonoldi, Mancini, Marini & Politi 2009; Molnar-Szakacs & Heaton 2012).

Conclusion

In this chapter we have explored the exceptional musicality that is found in around 5 – 10% of children on the autism spectrum, and considered some of the thinking that teachers may need to adopt in order to relate successfully to their autistic students and so be able to support them effectively in working towards their musical goals. The important thing is that children on the autism spectrum are given the opportunities to explore their musical interests and to fulfil their musical potential, whatever that may be, since such achievements

are likely not only to be intrinsically satisfying and to promote well-being in their own right, but may well also promote the very communication and social skills whose development the children's autism initially inhibited. That is, education *in* music and education *through* music are both likely to be essential ingredients in the pedagogical mix.

As the examples reported in this chapter illustrate, if there is an overriding principle in working with children with autism, it is that there is no one approach that is likely to succeed. I remain suspicious of *any* system that claims to offer the best for all, or even the majority, of children, since the spectrum of their abilities, needs, propensities, motivations, likes and dislikes is so wide. That is not say, of course, that one should not in time develop longer-term aims (taking into account the views of parents and other significant figures in a child's life), and have to hand an array of potential strategies (at least some of which will hopefully have been tried and tested in other contexts) to support the child in moving forward. But to approach music education with a severely autistic youngster with a more or less fixed plan is likely to be a frustrating experience for all concerned. Indeed, it may do more harm than good.

In summary, then, what approach should teachers take? I would say: listen, listen and listen again. Open your ears to whatever your pupils offer, whether exploring or playing the instrument that they have chosen (or have been presented with), or vocalising, or even just moving. They may even seem to do nothing at all or they may engage in apparently random behaviours, but experience suggests that everything a child does (or fails to do) occurs (or fails to occur) for a reason. Above all, be sensitive; be empathetic.

Having said there are no overriding principles, there is, perhaps, one exception: don't talk too much! Language is so often a barrier or, worse, a threat or, at best, distracting auditory clutter. (Be prepared, though, to listen carefully to anything the child may choose to say to you.) Save verbal interaction for the parents, *after* the lesson – which, unless there are exceptional circumstances, I believe they should attend. The relationship you may develop with their child through mutual, enjoyable musical engagement is far too precious to keep to yourself. It must be seen as a stepping-stone to a wider and hopefully deeper, purposeful connection with the often perplexing world of other people.

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