What can musical engagement in children with cognitive impairment tell us about their sense of self?

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Abstract

This chapter considers how engaging with music may support the development of a sense of self in children and young people with severe or profound cognitive impairments. Moreover, it is proposed that, by gauging how such individuals participate in musical activities reactively, proactively or interactively, teachers, therapists and carers can gain a sense of their pupils' or clients' state of self awareness – something that may be particularly valuable in the case of those who are non-verbal, or whose capacity for expressive language is in the early stages of development. Indeed, it is proposed that the way people create or react to music offers a unique insight into their personal consciousness. Finally, using evidence from the *Sounds of Intent* project (which has sought to map how musicality evolves in those with complex needs), a model is presented in which levels of self-awareness are explicitly linked to levels of musical development.

What is a sense of self?

Given the human capacity (and predilection) for metacognition, it is perhaps inevitable that thinking about who we are – reflecting on our sense of self – should have become such a philosophical preoccupation. From the time of Plato and Aristotle, one can trace the development of complementary and sometimes contrasting strands of thought down the centuries (Gallagher and Shear, 1999), ranging, for example, from Descartes's 'cogito' (which holds that the self comprises nothing more than an awareness of one's own mental events), to Locke's theory of the continuity of conscious thought, and Hulme's conception of the self as a bundle of sensations. At the end of the 19th century, William James laid the foundations for much modern thinking in his taxonomy of a number of different senses of self, including the physical, mental and spiritual, which are bound together within a 'stream of consciousness' (1890/1950). This notion of a composite identity resonates in the work of Ulric Neisser, who, a hundred years later, postulated distinctions between the ecological, interpersonal, extended, private and conceptual aspects of self (1988, 1993).

Shaun Gallagher analysed these and other philosophical conceptions of the self in his turn-of-the-century review (2000). He suggested that two categories, which he termed the 'minimal' self and the 'narrative' self, may be particularly helpful in furthering our understanding and positioning of the concept at the epistemological intersection between philosophy and cognitive science. The 'minimal' self he defines phenomenologically as 'a consciousness of oneself as an immediate subject of experience, unextended in time.' This 'depends on brain processes and an ecologically embedded body, but one does not have to know or be aware of this to have an experience that still counts as a self-experience.' The 'narrative' self, on the other hand, is a 'more or less coherent self (or self-image) that is constituted with a past and a future in the various stories that we and others tell about ourselves' (Gallagher, *op. cit.,* p. 15).

A key difference between the minimal and narrative selves appears to be the availability (or absence) of language. It is through language, Gallagher contends (*op. cit.,* p. 19), that 'we begin to make our experience relatively coherent over extended time periods. We use words to tell stories, and in these stories we create what we call our selves. We extend out biological boundaries to encompass a life of meaningful experience.' Gallagher draws support for this notion from Michael Gazzinger's neuroscientific studies of patients with severed corpora collosa (the bundles of white fibres that would otherwise connect the two hemispheres of the brain), which gave rise to the suggestion that one function of the left hemisphere of the brain is to generate narratives, using what he terms an 'interpreter', to produce a continuous sense of self (1998, 2006). Other evidence

is to be found in the field of child development, where studies of the emerging sense of self in young children (for example, Forrester, 2001) indicate that it is through exposure to, and participation in, talk that infants are provided with appropriate discourses to support them in understanding what constitutes the self and identity. And as adults, it is through language that we can communicate our metacognitive deliberations with others: we have some sense of what other people think about themselves because they can tell us about it.

But what of the minimal self? Following James Gibson's notion of ecological psychology (1977), José Bermúdez (1995, 2003) developed the notion that information defining the self can be gained through perceptual experience. That is, whenever we perceive things in the external environment, we also gain pre-linguistic and non-conceptual facts about ourselves (see also Neisser, 1988). In the absence of communication, though, how do we know that this sense of self exists? There are a number of sources of evidence. For example, Rochat and Hespos (1997) take the differential rooting response by neonates as evidence for an early sense of self, in that the babies' behaviour varies according to whether they touch one of their cheeks themselves (self-stimulation) or are touched by another (external stimulation). Gallagher (*op. cit.,* p. 17) looks to the imitation of facial gestures that neonates less than an hour old are capable of making (citing Meltzoff and Moore, 1983) as further evidence of a non-conceptual self-awareness, since for such mirroring to be possible implies that the infant can at some level 'recognise' that the face it sees is distinct from its own, yet realise too that it comprises the same type of entity (as comparable non-human objects are not imitated – Legerstee, 1991).

The putative existence of these two fundamental types of 'self' – the minimal and the narrative – begs a number of questions, which Gallagher articulates (*op. cit.,* p. 20). Three of these are of particular relevance in the current context:

- What relationship exists between the minimal self and the narrative self?
- Is one generated from the other?
- Do they operate independently of each other?

It is our contention that light can be shed on theses issues by exploring how musical engagement develops in children and young people with cognitive impairments. *Musical* development is a particularly apt medium to explore in this respect since it is universal (Nettl, 2006; Ockelford, Welch, Zimmermann and Himonides, 2005), it offers an intuitive, non-linguistic means of self-expression whose meaning can be detected by others, and it can serve a proxy indicator of identity, intentionality and well-being (Ockelford, 2011). Undertaking an investigation in the

context of *cognitive impairment* offers unique insights, since whilst the stages in the music-developmental journey appear to be broadly the same in so-called 'neurotypical' and intellectually disabled populations (Ockelford, 2008), the rate of change is often (though not invariably) far more protracted, enabling researchers to observe the evolution of skills in more detail and over longer time periods than would typically be possible. And because musical development begins *in utero* (see, for example, Woodward and Guidozzi, 1992; Lecanuet, 1996; Parncutt, 2006), the earliest stages can usually be difficult to study, whereas in those with severe or profound global delay, typically prenatal milestones may well be reached after birth.

The *Sounds of Intent* framework of musical development

The *Sounds of Intent* project was set up in 2002, as a joint initiative of Roehampton University and the Institute of Education, London, and the Royal National Institute of Blind People – a UK voluntary sector organisation working on behalf of blind and partially-sighted individuals, many of whom have additional disabilities. The initial aim was to map the musical development of children and young people with cognitive impairments – of whom there are an estimated 120,000 in England alone (House of Commons Education and Skills Committee, 2006) – an aspiration that has now been achieved following research over a number of years (see, for example, Ockelford, Welch, Zimmermann and Himonides, 2005; Welch, Ockelford, Carter, Zimmermann and Himonides, 2009; Cheng, Ockelford and Welch, 2010; Ockelford and Matawa, 2010; Ockelford, Welch, Jewell-Gore, Cheng, Vogaitzoglou and Himonides, 2011). Work is currently underway to produce an interactive web-based version of the *Sounds of Intent* developmental framework, which will enable practitioners to gauge children's levels of musical attainment, chart the changes that may occur over time and in response to particular interventions, and record qualitative observations in the form of verbal, video or audio data, in order to build up longitudinal profiles of pupils' experiences and achievements.

In the absence of pre-existing data or theories, the *Sounds of Intent* team adopted a heuristic approach to exploring what musical development in young people with severe or profound cognitive impairments might mean. This involved collaborating with a group of practitioners who were active in the field, principally music teachers and therapists, with a view to developing shared interpretations of the different forms and levels of musical engagement that they observed among their pupils and clients. Members of the group met regularly to share and analyse video recordings of musical behaviours that were deemed to be 'typical', 'exceptional', or of particular interest. The children's responses, actions and interactions were encapsulated in short descriptions such as

those shown in Table 1.

#	Observation	R	P	I
1	**A** sits motionless in her chair. Her teacher approaches and plays a cymbal with a soft beater, gently at first, and then more loudly, in front of her and then near to each ear. **A** does not appear to react.	✓		
2	**R** is lying in the 'Little Room' (a small, resonant environment, with soundmakers suspended within easy reach), vocalising in an almost constant drone. Occasionally a sudden movement of her right arm knocks her hand against a bell. Each time, she smiles and her vocalising briefly turns into a laugh.	✓	✓	
3	**M**'s music therapy session begins – as ever – with the 'Hello' song. And as ever, he makes no discernible response.			✓
4	**B** startles and then smiles when someone drops a tray of cutlery in the dining room.	✓		
5	**T** brushes her left hand against the strings of guitar that someone is holding near to her. There is a pause and then she raises her hand and brushes the strings again, and then again.		✓	
6	**Y** usually makes a rasping sound as he breathes. He seems to be unaware of what he is doing, and the rasping persists, irrespective of external stimulation. His class teacher has tried to see whether **Y** can be made aware of his sounds by making them louder (using a microphone, amplifier and speakers), but so far this approach has met with no response.		✓	
7	**G**'s teacher notices that he often turns his head towards her when she sings to him, but she has never noticed him turn towards other sounds.	✓		
8	**W** giggles when people repeat patterns of syllables to her such as 'ma ma ma ma ma', 'da da da da da ', or 'ba ba ba ba ba'.	✓		
9	**J**'s short, sharp vocalisations are interpreted by his teachers and carers to mean that he wants someone to vocalise back.			✓
10	**K** gets very excited when she hears the regular beat on the school's drum machine.	✓		
11	**U** loves 'call and response' games and joins in by making his own sounds.			✓
12	**C** copies simple patterns of vocalisation – imitating the ups and downs of her speech and language therapist's voice.			✓
13	**S** waves her hand more and more vigorously through an ultrasonic beam, creating an ever wider range of swirling sounds.		✓	
14	**N** often vocalises in response to vocal sounds that are made close to him, although he does not seem to copy what he hears.			✓
15	**Z** loves the sound of the bell tree and, when it stops, she rocks in her chair which staff interpret as a gesture for 'more'.	✓		
16	**D** has been able to make a wide range of vocal sounds since he started school, but recently he has begun to make more melodious vowel sounds, which he repeats in short sequences.		✓	
17	**L** hums distinct patterns of notes and repeats them. Her favourite pattern sounds rather like a playground chant, and her music teacher notices that she repeats it from one day to the next, though not always starting on the same note.		✓	
18	**F** cries whenever she hears the 'goodbye' song. It only takes the first two or three notes to be played on the keyboard for her to experience a strong emotional reaction.	✓		
19	**H** enjoys copying simple rhythms on an untuned percussion instrument. Now he is started making his own rhythms up too, and he flaps his hands with delight when someone else copies what he is doing.			✓
20	**E** just laughs and laughs when people imitate her vocalisations.			✓
21	**V** vocalises to get his therapist to make a sound – it does not matter what, he just seems to relish having a vocal response.			✓
22	**I** always gets excited in the middle of the 'Slowly/Quickly' song, anticipating the sudden change of pace.	✓		
23	**O** scratches the tambourine, making a range of sounds. Whenever he plays near the rim and the bells jingle, he smiles.	✓	✓	
24	**Q**'s eye movements intensify when he hears the big band play.	✓		
25	**X** distinctly tries to copy high notes and low notes in vocal interaction sessions.			✓
26	**P** has learnt to associate his teacher's jangly bracelet, which she always wears, with her: for him, it seems to be an important part of her identity.	✓		

Table 1 Observations of musical engagement by children and young people with profound cognitive impairment (after Ockelford, Welch, Jewell-Gore, Cheng, Vogiatzoglou and Himonides, 2011).

Examples such as these showed that it would not be possible to conceptualise the musical development of the children unidimensionally since, for instance, an individual's capacity for attending to sounds may well be greater than her or his ability to produce them. Therefore, at least two dimensions were required, which were conceived as 'listening and responding', for which the

single term 'reactive' ('R') was used, and 'causing, creating and controlling', for which the label 'proactive' ('P') was adopted. In relation to the examples given, observations 1, 2, 4, 7, 8, 10, 15, 18, 22, 23, 24 and 26 were considered to be entirely or predominantly 'reactive' and 2, 5, 6, 13, 16, 17 and 23, 'proactive'. This left a further group of observations (as in examples 3, 9, 11, 12, 14, 19, 20, 21 and 25), in which listening to sounds or making them occurred in the context of musical participation with others. It was decided that this form of activity merited the status of a separate dimension, and this was termed 'interactive' ('I') – see Table 1. Whilst the three dimensions are not conceptually discrete, the crucial thing was that the conceptualisation was deemed by practitioners to be both meaningful and useful in terms of contextualising and categorising the types of musical engagement that they observed.

The research team made a number of attempts to place examples such as those cited in Table 1 above along each of the three dimensions that had been identified: (a) *reactive* (in response to another), (b) *proactive* (initiating behaviour without an obvious external prompt), and (c) *interactive* (with another). The relative location of the examples within a dimension was based on the notion of contingency; that is, by seeking to identify each as a necessary precursor or possible successor to another or others. For instance, it seemed evident that an awareness of sound (Example 2) must precede a differentiated response (Example 7), which in turn must precede the capacity to anticipate change (Example 22). This heuristic approach was necessary since the evidence that was available largely comprised observations of *different* children at various stages of development, rather than longitudinal data on the *same* children as they matured, which would have offered greater certainty as to the nature of developmental change. Taking a more exploratory tack, though, was deemed valid as a preliminary step for two reasons: first, since it was not yet known what the appropriate data to collect would be; and second, since it was believed that meaningful longitudinal studies of children with severe or profound cognitive impairments would be likely to last for several years at least. However, it was felt that once an initial model had been developed, this could subsequently be used to inform longer-term empirical work, as well as being informed by it.

As potential sequences of stages in the evolution of musical engagement emerged, they were mapped onto what is known of 'typical' early musical development, drawing on the well-established literature in this field from the last 40 years, including Moog (1968/1976), Dowling (1982), Hargreaves (1986), Fassbender (1996), Lecanuet (1996), Papoušek (1996), Trevarthen (2002), Trehub (2003) and Welch (2006). This exercise was undertaken as a means of benchmarking what was being proposed, without imposing potentially inappropriate constraints, since it was not known just how relevant 'neurotypical' development was to the way in which the

musicality of children with cognitive impairments evolves.

A third influence was Ockelford's 'zygonic' theory of musical-structural cognition (for example, 2005, 2009), which seeks to explain how music makes intuitive sense through the (typically nonconscious) recognition of repetition and regularity in the domains of pitch and perceived time. The thinking was that, since such a capacity does not arise in people fully-fledged, it must evolve as a strand in musical development, implying that zygonic theory may provide a useful way of conceptualising stages within that process of maturation.

The three sources of evidence were drawn together (observations, the findings of 'mainstream' child psychology and zygonic theory) into a single coherent music-developmental framework through a cyclical process, whereby different configurations were proposed, discussed and systematically trialled in the field. Practitioners offered qualitative feedback, supplemented with quantitative data gathered by a research assistant. This information enabled the research team iteratively to refine the model, enabling it to capture a wider range of musical behaviours, and enhancing intra- and inter-domain consistency (Welch, Ockelford, Carter, Zimmermann and Himonides, 2009). Eventually, six levels of music-processing capacity emerged, which appeared to offer both an intuitively satisfying and theoretically coherent scheme; see Table 2.

Level	Description	Core cognitive abilities
1	Confusion and **C**haos	None: no awareness of sound as a distinct perceptual entity
2	Awareness and **I**ntentionality	An emerging awareness of sound as a distinct perceptual entity and of the variety that is possible within the domain of sound
3	Relationships, Repetition, **R**egularity	A growing awareness of the possibility and significance of *relationships* between the basic aspects of sounds
4	Sounds Forming **C**lusters	An evolving perception of *groups* of sounds, and the relationships that may exist between them
5	Deeper Structural **L**inks	A growing recognition of whole pieces, and of the frameworks of pitch and perceived time that lie behind them
6	Mature Artistic **E**xpression	A developing awareness of the culturally determined 'emotional syntax' of performance that articulates the 'narrative metaphor' of pieces

Table 2 The six levels of the *Sounds of Intent* framework (acronym 'CIRCLE').

Unfolding these six levels across the three domains of musical engagement that had been identified gave rise to the 18 'level descriptors' of reactivity, proactivity and interactivity. These were arranged as segments in circular form, which the practitioners on the *Sounds of Intent* team regarded as being an appropriate metaphor for children's development, ranging

from the centre, with its focus on self, outwards, to increasingly wider communities of others.

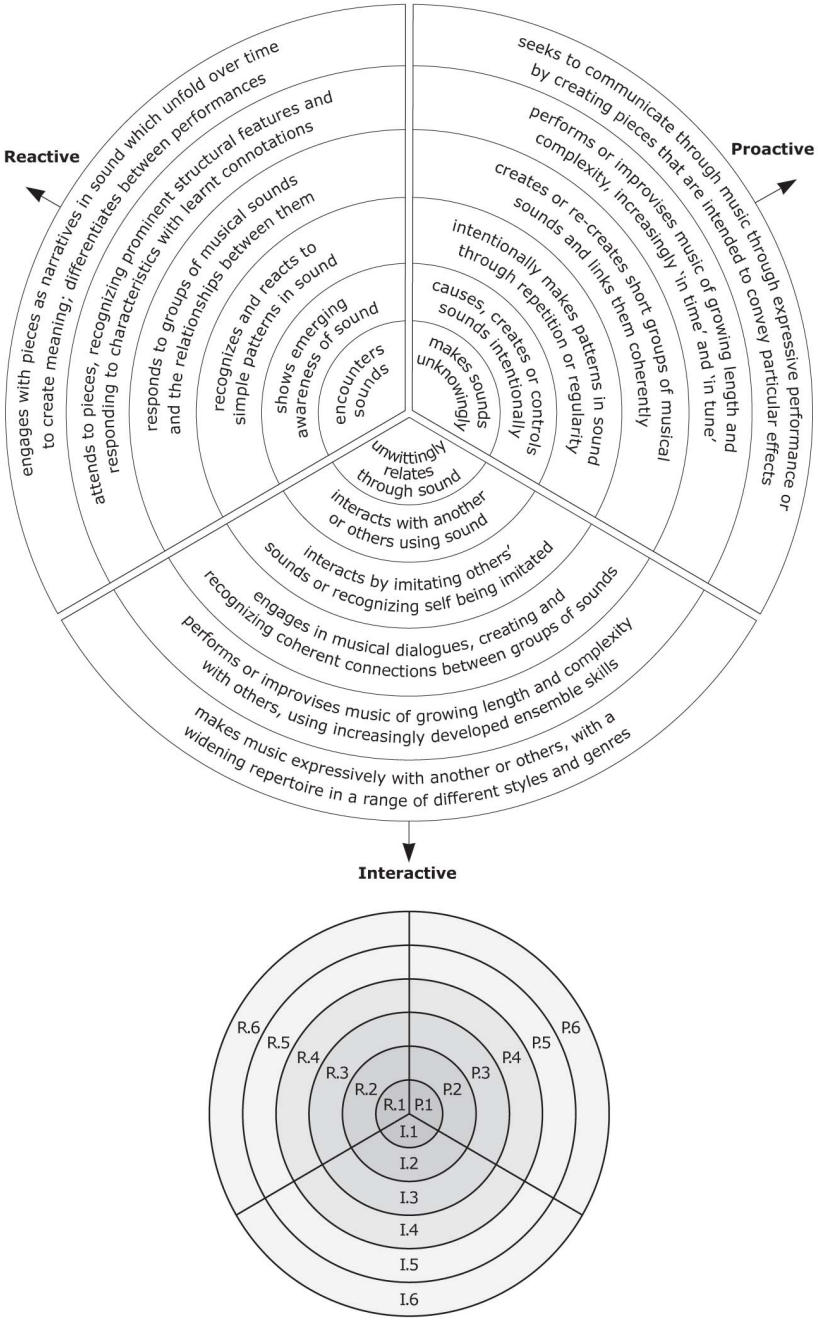

Figure 1 The *Sounds of Intent* framework.

For ease of reference, levels were ranked from 1–6, each of which could be preceded with an 'R', a 'P' or an 'I', to indicate, respectively, reactive, proactive or interactive segments. Each was broken down into four more detailed 'elements', as the examples in Table 3 show.

REACTIVE DOMAIN			
Level	**R.1**	**R.2**	**R.3**
Descriptor	**encounters sounds**	**shows an emerging awareness of sound**	**responds to simple patterns in sound**
Element A	is exposed to a rich variety of sounds	shows awareness (of a variety) of sounds	responds to the repetition of sounds
Element B	is exposed to a wide range of music	responds differently to sound qualities that differ (eg loud/ quiet), and/or change (eg getting louder)	responds to a regular beat
Element C	is exposed to music in different contexts	responds to sounds increasingly independently of context	responds to patterns of regular change
Element D	is exposed to sounds that are linked to other sensory input	responds to sounds that are linked to other sensory input	responds to sounds used to symbolise other things

PROACTIVE DOMAIN			
Level	**P.1**	**P.2**	**P.3**
Descriptor	**makes sounds unknowingly**	**makes or controls sounds intentionally**	**makes simple patterns in sound intentionally**
Element A	sounds made by life-processes are enhanced and/or involuntary movements are used to make sounds	makes sounds intentionally, through an increasing variety of means and with greater range and control	intentionally makes simple patterns through repetition
Element B	sounds are made or controlled through co-active movements	expresses feelings through sound	intentionally makes a regular beat
Element C	activities to promote sound production occur in a range of contexts	produces sounds intentionally in a range of contexts	intentionally makes patterns through change
Element D	activities to promote sound production are multisensory in nature	produces sounds as part of multisensory activity	uses sound to symbolise other things

INTERACTIVE DOMAIN			
Level	**I.1**	**I.2**	**I.3**
Descriptor	**relates unwittingly through sound**	**interacts with others using sound**	**interacts imitating others' sounds or through recognising self being imitated**
Element A	co-workers stimulate interaction by prompting with sounds and responding to any sounds that are made	sounds made by another stimulate a response in sound	imitates the sounds made by another
Element B	co-workers model interaction through sound	sounds are made to stimulate a response in sound	shows awareness of own sounds being imitated
Element C	activity to promote interaction through sound occurs in a range of conexts	interactions occur increasingly independently of context	imitates simple patterns in sound made by another
Element D	some interaction is multisensory in nature	interaction through sound engages other senses too	recognises own patterns in sound being imitated

Table 3 Elements at Levels 1–3 in the reactive, proactive and interactive domains.

The apparent simplicity and regularity of this table notwithstanding, the ways that the level descriptors and elements relate to each other within and between the reactive, proactive and interactive domains is complex. Level descriptors form a hierarchy such that, *within* each domain, achievement at higher levels is dependent on the accomplishment of all those that precede. So, for example, in the interactive domain, I.4, 'Engages in musical dialogues, creating and recognising coherent connections between groups of sounds', could only occur following I.3, 'Interacts by imitating other's sounds or recognising self being imitated' and (therefore) after attaining I.2 and I.1. *Between* domains, there is a broad flow of contingency that runs from reactive through proactive to interactive. For instance, in the proactive domain, intentionally making patterns in sound through repetition (P.3) depends on the

capacity to recognise simple patterns in sound (R.3); while interacting with another or others using sound (I.2) relies on the ability to cause, create or control sounds intentionally (P.2), which in turn requires an awareness of sound (R.2).

The pattern of contingencies that links the 72 *elements* (Table 3) is more intricate. Although in some cases there is a necessary connection between elements at different levels within domains (for instance, a pupil could not engage in intentional repetition – P.3.A – before having the wherewithal to make a variety of sounds – P.2.B) and between them (for example, imitating the sounds made by another – I.3.A – similarly requires functioning at the level of P.2.B), this is not always the case. It is perfectly conceivable that a child could intentionally make simple patterns through a regular beat (P.3.B), for example, before using sounds to symbolise particular people, places or activities (P.2.D). However, the research team felt that intricacies of this type were an inevitable consequence of the complicated nature of musical development, which is both multi-layered and multi-stranded. It was thought to be unlikely that, at any given time, the framework would indicate a pupil as being at a particular *point* on a developmental scale, but, rather, having a music-developmental *profile*, incorporating attainment at different levels in relation to a number of different elements.

Relating the *Sounds of Intent* findings to a developing sense of self

Although the *Sounds of Intent* project focussed on children's evolving capacities to engage with music, in reality, these cannot be separated from the wider cognitive, emotional and social development of the individual; indeed, there is a substantial body of research indicating that music is typically a key element in one's maturing sense of intrapersonal and interpersonal identity (MacDonald, Hargreaves and Miell, 2002). Therefore, it may be possible to map the notions of 'minimal' self and 'narrative' self onto the six *Sounds of Intent* levels of musical development, and so potentially shed light on unresolved issues identified by Gallagher as to the nature of relationship between the two. We will approach the issue by setting out a theoretical connection between the *Sounds of Intent* framework and an evolving sense of self, and subsequently offer case studies to support the model that is proposed. First, we consider how the *Sounds of Intent* levels relate more widely to early communication, as this will offer a broader context for what is proposed.

Ockelford (2002) sets out a four-phase model of the development of expressive communication, which is reproduced in simplified form here, with the addition of a fifth stage, pertaining to pragmatics (see Table 4).

type and phase of expressive communication	*vocal*	*gestural / visual (person-based)*	*gestural / visual (exernally-based)*
non-intentional	cries in response to need	for example *arches back in displeasure*	looks at things
intentional	deliberately vocalises to show need	for example *extends arm to attract attention*	points to things
symbolic	makes personal utterances: for example *says 'mmm' meaning 'hairdrier'*	makes personal signs: for example *flaps hand for 'yes'*	points at pictures draws
formal	speaks (using words)	uses conventional signs	points at symbols or words writes
pragmatic	uses language (irrespective of domain) with appropriate contextual meanings		

Table 4 Model of the development of early communication (after Ockelford, 2002).

These five phases can be mapped onto the six *Sounds of Intent* levels as follows (*cf.* Ockelford, 2008, p. 132).

phase of expressive communication	*corresponding* Sounds of Intent *proactive levels*	*corresponding* Sounds of Intent *interactive levels*
non-intentional	P.1 makes sounds unkowingly	I.1 unwittingly relates through sound
intentional	P.2 causes, creates or controls sound intentionally	I.2 interacts with another or others using sound
symbolic	P.3 intentionally makes patterns in sound through repetition or regularity	I.3 interacts by imitating other's sounds or recognizing self being imitated
	P.4 creates or re-creates short groups of musical sounds and links them coherently	I.4 engages in musical dialogues, creating and recognizing coherent connections between groups of sounds
formal	P.5 performs or improvises music of growing length and complexity, increasingly 'in time' and 'in tune'	I.5 performs or improvises music of growing length and complexity with others, using increasingly developed ensemble skills
pragmatic	P.6 seeks to communicate through music through expressive performance or by creating pieces that are intended to convey particular effects	I.6 makes music expressively with another or others, with a widening repertoire in a range of different styles and genres

Table 5 Sounds of Intent levels mapped onto the model of early expressive communication.

To consider how this composite developmental map may relate to an evolving sense of self, let us remind ourselves of the two definitions supplied by Gallagher (2000, p. 15):

(a) The *minimal* self is 'a consciousness of oneself as an immediate subject of experience, unextended in time.'

(b) The *narrative* self comprises a 'self-image that is constituted with a past and a future in the various stories that we and others tell about ourselves'.

These definitions imply a number of differences between the two forms of self:

domain	***minimal* self**	***narrative* self**
perceptual / cognitive processing	pure sensation (perceptual)	interpretation of sensations (cognitive)
temporal status	exists only in the perceived present	takes into account the past, present and future
symbolic representation	no	yes – can take the form of language

Table 6 Interpretation of Gallagher's 'minimal' and 'narrative' selves in terms of perception and cognition, perceived temporal status and symbolic representation.

Combining the model presented in Table 5 with the thinking presented in Table 6 suggests that musical development and an advancing awareness of self may be evolve together along the following lines (see Table 7).

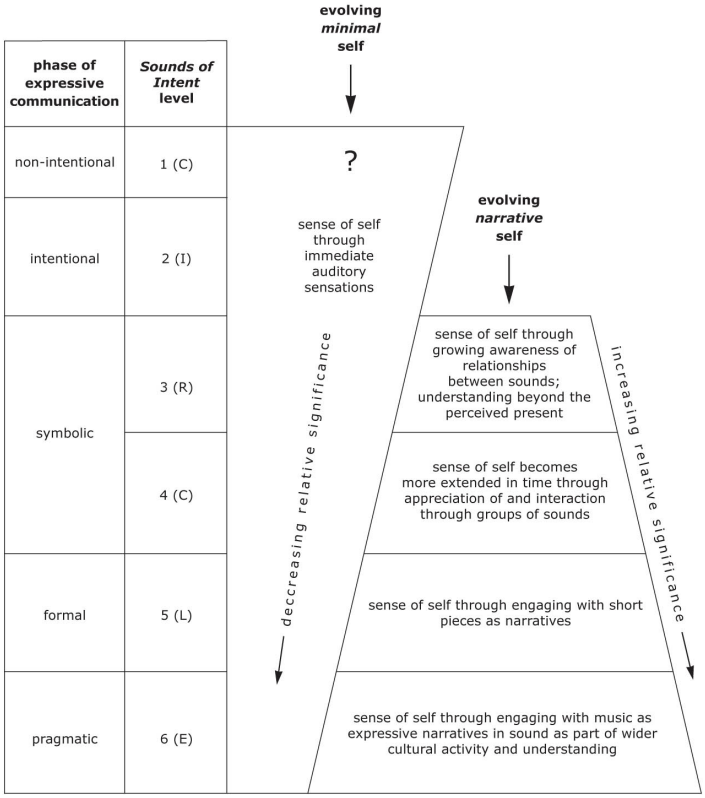

Table 7 Possible parallels between stages of musical development and an evolving sense of self (*cf.* Tables 2 and 5).

Six examples

To provide an initial assessment of the validity of this multimodal framework, we now provide six examples of children, young people and adults engaging in musical activity at each of the *Sounds of Intent* levels, and consider what this may tell us about their senses of self, using evidence from other, non-musical contexts where this is available.

1. *Joe*

Joe suffered catastrophic perinatal hypoxic brain injury, which profoundly affected his development. Today, aged six, his *Sounds of Intent* assessment is as follows.

REACTIVE – LEVEL 1

Observation

Joe appears to pay no attention to the wide range of sounds to which he is exposed, and no responses can be observed.

Interpretation

His teacher takes this to mean that Joe does not process sound as a distinct or meaningful sensory experience.

PROACTIVE – LEVEL 1

Observation

The only sounds Joe makes occur as a consequence of certain life-processes such as breathing, for example.

Interpretation

Joe's teacher believes that he is unable to act with volition on his environment; he appears to have no sense of agency.

INTERACTIVE – LEVEL 1

Observation

Attempts to interact with Joe through sound (for example, by physically supporting him to produce sounds in response to those that are created in his environment, or by responding to the sounds he makes through inhaling and exhaling) have no apparent effect.

Interpretation

This is interpreted as Joe having no sense of interagency involving himself and another person in the domain of sound.

This assessment suggests that Joe does not have even a minimal sense of self as defined by Gallagher, since he neither appears to have the capacity to process incoming sensory input (implying that he has no sensation of sound as it is generally understood) nor to be capable of acting with volition on his environment. Now it could be that there exists a more primitive sense of self than the so-called 'minimal' self (which is determined by observable physical behaviours) or it

may be that the concept of the 'minimal' self needs to be extended, since recent neuroscientific research has shown that patients who are unable to make voluntary 'bedside' responses may nonetheless be able to communicate through the wilful modulation of brain activity (Monti, Vanhaudenhuyse, Coleman, Boly, Pickard, Tshibanda, Owen and Laureys, 2010). Since Joe's brain trauma occurred at birth, it seems unlikely that he would have had the necessary bank of sensory experiences available for him to think about, which is the mechanism underlying the protocol used by Monti *et al.* However, in the absence of evidence to the contrary, it would seem ethically and philosophically unsafe to assume that Joe has no minimal sense of self unless and until it were demonstrated incontrovertibly otherwise.

Hence we can conclude that it is important for teachers and therapists working with and caring for those assessed (through physical observation) as being at Level 1 of the *Sounds of Intent* framework to seek to engage their pupils and clients in musical activity, not only since this may promote musical and wider development, but as it may contribute to a sense of minimal self as yet unidentified.

2. *Emily*

Emily has cerebral palsy and profound learning difficulties. She is 12 years old. Her *Sounds of Intent* assessment is as follows.

REACTIVE – LEVEL 2 *Observation* Emily responds to loud sounds (such as the clash of symbols or the bang of a drum near to her) with a smile, though quieter sounds appear to elicit no response. *Interpretation* Emily's music therapist takes this to mean that Emily can process certain gross stimuli in the auditory domain. PROACTIVE – LEVEL 2 *Observation* In the 'little room' (a specially constructed micro-environment in which she lies supine), Emily will reach up to the cowbell that is suspended from above and strike it with her hand to make it sound. *Interpretation* Emily's teacher interprets this is evidence of her having a sense of agency, with the necessary cognitive and motor capacities to produce or control sounds intentionally. INTERACTIVE – LEVEL 2 *Observation*

In the multisensory room, Emily will operate a switch to turn on lights and music, but only when prompted by her support worker sitting very close to her and singing 'turn on the switch' in her ear.

Interpretation

Emily's educational psychologist believes this shows that she has some notion of a sense of agency that can exist between her and another person.

This assessment suggests that Emily has a 'minimal' sense of self – pre-linguistic and non-conceptual – that she has gained and is reinforced through perceptual experience. In the absence of verbal confirmation, the strongest evidence for this stems from her interactions in the multisensory room, where Emily's support worker's singing is required to prompt her to turn the music on, arguably indicative of an early sense of self and other.

3. *Matthew*

Matthew, eight, is blind and has severe learning difficulties. He communicates some everyday needs (such as 'drink' and 'more') using idiosyncratic sounds and gestures. He appears to understand a few key words when reinforced with on-body signing (for example, 'toilet' and 'swimming'), though his responses to these are not consistent, and it is often hard for his support workers to know whether he has taken the message on board. His *Sounds of Intent* assessment is as follows.

REACTIVE – LEVEL 3

Observation

Matthew gets very excited when he hears the drum being played – and is particularly responsive to a regular beat that starts quietly and get louder.

Interpretation

Matthew's music teacher at school takes this to mean that he can recognise simple musical structures that involve regularity and regular change over time.

PROACTIVE – LEVEL 3

Observation

Matthew can keep to a regular beat on a range of percussion instruments – and he particularly enjoys starting slowly and getting faster.

Interpretation

Matthew's music teacher interprets this as showing that he can produce simple musical structures that involve regularity and regular change over time.

INTERACTIVE – LEVEL 3

Observation

Matthew enjoys engaging in simple musical dialogues with his music therapist: she taps a drum two or three times and he copies, and *vice versa*.

Interpretation

Matthew's music therapist believes that this shows he has a sense of *reciprocal imitation*: he is happy to be influenced by other people and shows this by copying what they do, and he also likes influencing what others do and understands that this occurs when they copy him.

This assessment suggests that, in addition to a 'minimal' sense of self, shown by the fact that he responds to immediate auditory experiences, Matthew arguably has an early form of 'narrative' self, since he can process sensations over time and appreciate the simple patterns they can make – helping him remember what has occurred and enabling to anticipate what is coming next. Hence he has a (non-conceptual) sense of personal location in time. Although Matthew's narrative self is pre-linguistic, he is aware at some level that sequences of sound can indicate mutual schemes of influence operating between himself and other people.

4. *Sandip*

Sandip, 11, has severe learning disabilities, visual processing difficulties and a diagnosis of autism. Although there is no evidence that he understands language, his reactions suggest that he knows what is going to happen next, and which activities have finished, by using a timetable employing 'objects of reference' (Ockelford, 2002). And he can make simple choices when presented with two objects of reference at the same time. His *Sounds of Intent* assessment is as follows.

REACTIVE – LEVEL 4

Observation

Sandip spends a good deal of his free time listening to excerpts from TV theme tunes. He will listen to the same fragments of music over and over again.

Interpretation

Sandip's parents (who are musicians) are of the view that their son's listening preferences indicate that he recognises that music is constructed in distinct 'chunks' (though that he is not yet engaging with pieces as extended narratives in sound).

PROACTIVE – LEVEL 4

Observation

Sandip often sings or hums concatenations of musical motifs to himself from different pieces that he has heard.

Interpretation

Sandip's music teacher interprets this as evidence of his capacity to connect successive groups of notes coherently.

INTERACTIVE – LEVEL 4

Observation

Sandip revels in 'call and response' activities in music, vocally copying and sometimes varying short phrases that are sung to him, and taking delight in offering ideas for others to copy, in either case systematically taking turns to listen and contribute.

Interpretation

Sandip's teacher takes this to mean that he can understand how extended musical dialogues can be created through imitating groups of sounds to form coherent chains.

This assessment suggests that, as well as a minimal sense of self, Sandip has a significant (though presumably non-linguistic) form of narrative self, since he can understand how series of notes presented over time can form groups, and how these can be used to create more substantial sequences that he can formulate on his own or by participating with others. Through improvised musical exchanges, he can sense the effect of placing his own ideas in a shared domain, and having them picked up, repeated and developed by others; and he is aware of his own capacity to imitate and vary the musical materials that other people offer – all within an extended temporal framework of turn-taking.

5. *Mia*

Mia has moderate learning difficulties and autism spectrum disorder. She is 17 years old. Her verbal communication, though limited to everyday topics, enables her to express her immediate needs, wishes and views effectively. She is proud of her singing abilities, and likes to talk about her musical achievements with her friends and the adults in her life. Mia's *Sounds of Intent* assessment is as follows.

REACTIVE – LEVEL 5

Observation

Mia enjoys listening to music on her iPod – particularly pop music. She listens to pieces carefully all the way through and anticipates key structural features such as the choruses of songs.

Interpretation

Mia's music teacher takes this to mean that she recognises pieces of music as entities comprising sequences of related groups of events that conform to given frameworks of pitch that unfold over time.

PROACTIVE – LEVEL 5

Observation

Mia has taught herself to play the tunes of some of her favourite songs on the keyboard. Her playing is rather 'wooden', but the elements appear in the correct order, and she enjoys singing along with her playing.

Interpretation

Mia's music teacher takes this as confirmation that she has a grasp of pieces of music as structural entities.

INTERACTIVE – LEVEL 5

Observation

Mia provides the lead vocals in her school band. She and her classmates reproduce simple cover versions of well-known pop songs that faithfully follow the structure of the originals, though her capacity to perform with 'authentic' expressivity is limited.

Interpretation

Mia's music teacher regards this group activity as being particularly significant, since it shows that she can attend to others' performances while performing herself, cognisant of their influence on her, and aware of her own influence on them.

This assessment suggests that Mia's engagement with music supports her evolving sense of narrative self in two ways, since she can recreate familiar pieces of music with others and is able to reflect on her capacity to perform with those around her. Hence music provides her both with an immanent vehicle for perceiving herself in relation to abstract narratives in sound that unfold over time as well as a means of relating to others socially, through acknowledged success in musical activity. This recognition is key to the construction of her intra- and interpersonal identities.

6. *Derek*

Derek is blind, has severe learning difficulties and autism spectrum disorder. Thirty-one years old, he started to teach himself to play the piano when he was only two. Derek could perform competently before he could use verbal language in a comprehensible way, and today his grasp of music is still far more advanced than his capacity to engage in conversation. He is an acknowledged 'musical savant': someone who has exceptional abilities in the context of global developmental delay. He spends a good deal of time engaging directly in musical activities, or planning them, or reflecting on performances in which he has played a part. Derek's abilities are internationally recognised, and he travels a good deal in the UK and abroad giving concerts in a wide range of venues. He features regularly on television all over the world. He is aware of his fame, and, despite his verbal limitations, he relishes interacting with members of the public. Through numerous positive performing experiences in many different contexts, his social skills and self-esteem developed markedly through his twenties. When asked about his identity, he says: 'I am Derek. I play the piano.' Derek's *Sounds of Intent* assessment is as follows.

REACTIVE – LEVEL 6

Observation

Derek listens to a great deal of music, and can identify thousands of pieces, their performers and even in some cases particular performances. He is conversant with most well-known Western styles and genres.

Interpretation

Derek's mentor (the first author) takes this to mean that he recognises the probabilistic patterns that are the determinants of style, and the features of interpretation that mark out one performance from another.

PROACTIVE – LEVEL 6

Observation

Derek has a vast repertoire of pieces he can perform on request on the piano. He can improvise on the music with which he is familiar in any key and in a range of styles. He can deliberately evoke different moods in his playing.

Interpretation

Derek's mentor believes that this shows he understands the expressive capacity of music, and that he is able to use culturally learnt performance practices to communicate with audiences in predetermined ways.

INTERACTIVE – LEVEL 6

Observation

Derek enjoys performing with a range of other musicians, and is a particularly sensitive accompanist, picking up on the rubato, vibrato and dynamics used by singers, for example, and intuitively adapting his improvised accompaniments to support and enhance their expressive intentions as he perceives them.

Interpretation

Derek's mentor interprets this as evidence that Derek has learnt the 'expressive grammars' of performance in a given style, and can incorporate them into his own playing in real time to create persuasive narratives in sound.

This assessment suggests that the evolution of Derek's sense of self – now so clearly focussed – has been linked inextricably to his developing abilities and experiences as a pianist. We can surmise that his narrative sense of self started to emerge when, as a little boy, he recreated and improvised on the music he heard in his environment. These early efforts would have given him a sense of auditory structures unfolding over time: journeys in sound of his own making, where (unlike other areas of his life) he was in control. Subsequently, in his teens, group improvisations and performances not only enhanced his sense of self and other long before his linguistic abilities were up to the task, but, in adulthood, they have provided him with an avenue through which he could sense the feelings of others, and offered im platforms to contribute to the joint expression of emotion through sound. Through performing in countries across Europe and the US, and through the feedback he receives via the internet from audiences across the world in response to his television appearances, Derek's sense of self has extended beyond local communities of interest to wider culture. The story of his life can be summarised as narratives in sound becoming narratives of self.

Conclusion

This chapter shows both at a theoretical level and through six vignettes how engaging with music, at all levels, can promote a sense of self in children and young people with cognitive impairment, and how such engagement can serve as a proxy indicator of self-awareness, particularly in those who are not verbal. Through reactive, proactive and interactive

participation in musical activities one can hypothesise how a 'narrative' sense of self evolves alongside a continuing 'minimal' sense of self as an individual's capacity to engage with music develop. Future research using brain imaging and electroencephalography to gauge neurological responses to music holds out the prospect of being able to detect the existence of hitherto unidentified self-awareness in those whose level of impairment does not permit a physical response.

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