

# A gestural language for the representation and communication of vocal harmony

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## Introduction

Recent brain research (reviewed in Wallin 1991; Deacon 1997) has illuminated the neurological pathways involved in musical perception and behaviour. A function is argued for music in both evolution and child development (Cross, 1999; Papousek 1996) which demands a response from educators. Focusing on the roles of **social intelligence** and **physical/spacial awareness** (Gardner 1983) in the light of the developmental synthesis proposed by Mithen (1996), one might conclude that practice in the classroom can be inconsistent with what we now know about the holistic manner by which children acquire and maintain skills, sensitivity and understanding. The allure of Information Technology solutions to the new challenges of classroom composing and improvising, with their sedentary and individualistic workstations, endangers the social and kinaesthetic experience so crucial to music in general and singing in particular.

Gestural communication in group music-making has been practised since the Ancient Greeks and Egyptians (Gerson-Kiwi, 1980), and via Guido d'Arezzo, Curwen, Dalcroze and Kodály has remained available as a resource in modern pedagogy. **Harmony Signing** builds on these cheironomic foundations to establish a gestural system able to allow participants to develop compositional and improvising skills in vocal groups. Its purpose is to replace left-brain processing (paperwork and verbalisation) with a rich and powerful mechanism for developing aural awareness, harmonic understanding and vocal confidence based on movements which become instinctive both for signers and participants. A bridge can be built between classroom and choral experience in which leadership roles are taken by pupils. Musicality, the capacity for independent musical perception and productivity, is thus 'caught', not taught.

## The background to the development of harmony signing

Teachers and directors working with vocal ensembles, whether they be classroom groups working on creative projects (Bannan, 1988; 1994) or choral groups of any age (Ternstrom, 1993), encounter the common phenomenon of singers' difficulties in 'holding a part'. How successful leaders of vocal groups are in helping singers to overcome

problems depends on a great many variables:

- the musical experience of the group;
- the balance of voices in the group;
- the intrinsic difficulty of the material;
- the skill of the leader in providing support;
- the motivation of the group to succeed.

This paper focuses on a means of developing generic skills in part-holding and voice-leading which promote harmonic awareness, build vocal confidence, and exercise the capacity for blend and tuning. It will be clear that such a programme addresses means of achieving progress in most of the categories in the preceding list.

The precise methodology of **Harmony Signing** arose and developed in tandem with a theoretical research project concerning evolutionary explanations for the phenomenon of human musicality (Bannan, 1997; 1998a; 1998b; Vaneechoutte and Skoyles, 1998). The hypothesis is that choral singing represents a behaviour with roots in the most instinctive and universal features of human communication. Whilst this hypothesis can never be proved, in that we are unlikely ever to be able to replicate the conditions in which proto-human communication took place, it is nevertheless possible to observe parallels with the physiological bases of animal communication (Scherer, 1991; Ekman, 1973, 1998), and to trace the development of vocality in human infants so as to construct models of the means by which oral/aural communication is acquired and how this varies with culture. The role of music in such models is what distinguishes them from the language-acquisition theories of Bickerton (1990) and Pinker (1994, 1998), who not only fail to consider the role of song in carer-infant interaction, but also place a low emphasis on intonation as carrier of meaning.

## Vocal harmony and speech

A key feature of viewing music as the foundation of the capacity for language is to consider vowels as distinct harmonic events: or, at least, to remind ourselves that the aural capacity to distinguish so accurately between vowels that languages can permit accurate

### The Main Vowels in English

illustrated by words and names beginning with a **B** sound and ending with a **T** sound

Boot (english)	[Boo-wot (geordie)]			
Boat	Bought	Bott	Bart	Bat
Bet	Bate	Bit	Beet	Boot (scottish)
Bute				

communication must depend on an existing sensitivity to timbre.

Speakers of English are able to distinguish between these words and names, and thus discern meaning or designation, essentially through assigning to them a position in the vowel spectrum perceived to be characteristic of the voice of the speaker. This is a sophisticated ability, since *migrations* (Miller, 1986) occur, for instance, as a consequence of different accents: English cricketers with a <bat>, Australians with a <bet> and South Africans with a <bit> may well be talking about the same object. Clearly context, both pragmatic and grammatical, makes its contribution to meaning. But the raw material of communication embodies this mechanism of vowel-matching in both perception and production. Those who struggle to learn foreign languages as adults will have encountered just this phenomenon in trying to make themselves understood to an unsympathetic native speaker. As the list above illustrates, speakers of English have to be able to recognise and reproduce some 11-13 distinct vowel sounds for optimum communicative efficiency (Fry, 1979). To an acoustician, this is explained as a process of discerning the properties of different partials in relation to the fundamental frequency produced at the vocal folds, and is achieved by varying resonance through muscular action of the tongue and vocal tract. As such, it is a musical skill. The main carrier of language - vowel sound - is the consequence of musical behaviour. Harmony Signing sets out to exploit this universal capacity for harmonic perception and production of all oral language-users through systematically developing acuteness of listening and response in the same social conditions in which language acquisition flourishes in early childhood.

## Musical aspects of child language acquisition

The human capacity for communication through the medium of shared verbal language depends on speakers acquiring the ability to mimic and recall such sound structures from infancy. The perceptual mechanisms for this are active in the womb (Woodward, 1992), muscular systems for silent facial mirroring between carer and infant develop rapidly within the first 3-6 months (Locke, 1993), and there is evidence that accurate musical responses follow almost immediately (Kessen et al, 1979; Minami and Nito, 1998). Deacon (1997) illustrates the *contagious* nature of such shared communication, which one can adopt as a yardstick for separating instinctive responses (laughter, empathy, music) from the subtler assumptions involved in spoken interaction, in which exchange is more like the 'transmit or receive' functions of two-way radios. Speech, then, involves *serial* phenomena, where song grows through *simultaneous* interaction.

Wallin (1991) examines research into the neurological pathways in the brain and nervous system on which such a duality depends. There is an extent to which language and music are processed in quite different ways: the capacity for the simultaneous, for perceiving tone colour, amplitude and continuity depending largely on the right hemisphere, while serial organisation, attribution of meaning, especially within grammatical relationships, and selection of response are more the focus of the left. In emotional terms, the right hemisphere may be the seat of our capacity to make the intuitive connections with the sound-making of others which gives rise to the ability to sing in unison, while the left

monitors whether we feel safe to do so. The 'fight or flight' mechanism which can inhibit or deny continuation of involvement represents, as it were, the pragmatic veto of the left hemisphere over the right.

It is not difficult to imagine the extent to which teaching procedures reinforce this psychological reality in a manner which promotes such inhibition. The teacher is, under most circumstances, attempting to address both hemispheres of the brains of pupils almost exclusively via the left; and is aiming to access simultaneous processing through one-way serial mode. This is all the more acute where the teacher feels the need to assert discipline or control. In trialling the teaching processes which led to the invention of Harmony Signing, it was apparent that this traditional form of communication with the social groups which make up both classes and choirs was often inappropriate to the needs of participants. The theoretical underpinning of Harmony Signing has been, then, involved the search for a pedagogy which transcends the limitations and ineffectiveness of the classic teacher/director model. In particular a case is argued for the preservation in musical learning of the gestural vocabulary of the behavioural trait which first gives rise to music in our species: the instinct of children to play (Bjørkvold, 1992; Bailey and Farrow, 1998). Through seeking to harness rapid, instinctive responses, as opposed to the representational mode of 'talking about music', such a pedagogy builds on the proposal (Cross, 1999) that music played an essential role in the means by which the human species evolved with the capacities for communication and problem-solving we possess, and continues to play a role in the development of every individual (Papousek 1996); and that the mind of *homo sapiens* developed under evolutionary pressures which determined links between oral/aural communication and manual dexterity (Mithen, 1996).

## The foundations and development of harmony signing

Gardner (1983) proposed two specific intelligences within his modular framework of human mental capacity whose roles in relation to music were taken to be fundamental to the Harmony Signing project: social intelligence and physical/spacial awareness. Observation of a wide variety of examples of choral and classroom vocal practice, including video of the author's own sessions, had led to the conclusion that pedagogy is often inconsistent with the developing consensus presented by psychological research into how children learn. A low incidence was evident of: gesture and movement; children's spontaneous musical decision-making; children's capacity for leadership within the social group; the modelling of mimicry on material initiated by participants. A systematic means was sought of addressing these matters. Simultaneously, investigations were carried out into the similarity and differences of child and adult learning in a vocal context (Bannan, 1998c): it became clear at an early stage that adult learners harboured inhibitions, misconceptions and limitations of experience to which Harmony Signing might also be applied.

As with so many technologies and inventions, the truth is that the seeds of the Harmony Signing system were discovered almost accidentally:

**Harmony Signing** first arose almost unnoticeably out of the weekly activities of the Reading University Children's Choir. The RUCC is a fairly normal group of unauditioned children who come together to sing. What distinguishes them from other similar groups is the accent on creativity: the children write their own songs, invent their own games and vocal exercises, and work on arrangements of existing material. One day in the summer of 1996, a group of children had begun devising a harmonic background to a melody. They knew which notes each was to sing, and how to move from one chord to another: where things went wrong was knowing *when* to change the chords. I suggested they agree on a simple set of signals. It worked so well, we transferred their arrangement to the whole choir, and continued to use the signing system for other work in subsequent weeks. As ever, necessity was the mother of invention. (Bannan, 1999)

A pattern of signs was developed to represent the Tonic, Subdominant and Dominant chords, allowing the signer to guide the voice-leading of participants. This established the means for free harmonic improvisation and the devising, as in the example cited, of accompaniments to melodies. The introduction of further signs permitted both the inversion of chords, and modulation to the dominant or subdominant of the starting-point. Signing of harmonic processes was then combined with Kodály-based signing of melodic material, giving rise to the capacity to develop group composition, to sign arrangements carried in the head of the signer which participants were able to perform from scratch, and to investigate the properties of dissonance and resolution, chromatic decoration and voice-leading, and harmonic rhythm. All of this was achieved initially with voices, though the later, creative stages have also been replicated with instrumental groups. An outcome of varying the practice with different subjects confirmed that where instruments were introduced, participants who had mastered the same stage vocally were more fluent and able to master expressive interaction more quickly than those whose first experience of a stage in the process was instrumental.

Harmony Signing was developed through a series of Action Research projects with varying client groups, including children of various ages and abilities as well as adults drawn from ensembles with markedly different musical tastes. What became apparent was that Harmony Signing is simultaneously a means of *communicating* information and intention to others and of *representing* it to oneself. The pedagogy thus fulfils Bickerton's (1990) criteria for the development of language, and, in doing so, parallels the practice of verbal signing by the deaf (Sacks, 1990). Further research is required which should observe and measure the extent to which musical thinking can be enriched, deepened or accelerated through the use of the Harmony Signing. But the shaping of the pedagogy itself in its most advanced forms has responded to what exponents have said and done:

- an 18 year old University applicant in Music who stated that she understood fully the characteristics of *suspension* for the first time as a consequence of experiencing them as a participant and signer;

- 15-year old students preparing for composing assignments who found the capacities of chromatic inflection around diatonic harmony opened up new expressive opportunities;
- members of a Children's Choir aged 9-10 with limited understanding of notation who were able to work out vocal arrangements of melodies using Harmony Signing;
- members of an adult chamber choir who had never been taught harmonic function were able to develop their personal contributions to blend and tuning;
- teenage participants whose capacities to think physically in the system more than matched those of the author, and who were keen to propose refinements and test it to its limits.

Paradoxically, information about how this system related to musical thinking was vividly provided by experienced musicians who found Harmony Signing difficult to operate. It would seem that the more expertise had been developed in thinking about harmonic relations and properties on paper, the less able such participants were to allow intuition to take over. What noticeably defeated such musicians was the modulation exercise in which a chord changes role as one tonic is replaced by another: those for whom this process had always been inwardly represented through work on the keyboard or musical staff found themselves having to visualise or 'finger' the operation in order to discover what notes to sing! Such strategies were never evident in younger participants, even where they possessed advanced musical performance skills. It would seem that paper study of the kind carried out in University degrees and Conservatoire diplomas is responsible for demanding only one form of musical thinking. In view of the fact that this constitutes the training route through which so many of our future teachers qualify in their subject, the need for a bridge which allows re-entry into the instinctive musical world of the child and amateur could not be clearer.

## **Conclusions: the future of harmony signing**

As much as the development of Harmony Signing has been informed by the latest research into music psychology and current thinking about how human beings relate perception to productivity, the gestural language which has evolved also represents a research tool in its own right. Observations of participants illustrate that it may have a remarkable potential for diagnosing the nature of their musical behaviour. For some subjects, the empowerment it extends can accelerate the confidence to engage with musical ideas; the quality of movement of signers also indicates clear differences between those who are feeling the music they are communicating as a continuous, intuitive process and those for whom each event is 'tagged' as a separate experience (something like the game of

'scissors, stone, paper'). A further duality is that of the difference between subjects who make the most of the opportunity to involve others in the group and feel most socially at ease, and those for whom the process of signing is primarily internal, and for whom rapport with the group is less relevant. One means of shedding light on this, made possible by the late arrivals of participants in an adult group, was to instruct subjects in the signing procedures without telling them what they were for! However surprised the reaction of the signer to the result, it illustrated both that shaping the singing of others can be intrinsically pleasurable, and that it pays not to worry about the outcome.

In all these different cases one was led to reflect on the research literature and previous projects which together shaped the designs of Harmony Signing. Deacon's (op cit.) theory of the 'contagion' evident in certain forms of behaviour underlined the extent to which this should be seen as a virtue to be exploited by music teaching. Practice in the classroom will then yield the heightened learning which arises when individuals are empowered through optimal experiences. An example of this which predated the development of Harmony Signing in the projects from which the system arose was to employ acoustic representations of children's voices which reward participation in the form of echo, both natural and artificial (Bannan 1988). A psychologically similar outcome arose from the vocal sharing in a choral group of short songs composed by members:

Child A, a bright and willing but shy performer, devised a simple, chant-like setting of her poem. It was easily learnt by the others despite Child A's initial hesitancy, which endowed her performance with several ambiguities and inaccuracies. Nevertheless, the group performance ironed these out almost intuitively: Child A was asked whether what the choir sang represented her intentions. Once the rest of the choir had learnt her song, this so boosted Child A's confidence that she was able to perform the first verse herself as a solo at the next concert. (Bannan, 1996)

The context of creativity in which these practices have been focused through the development of Harmony Signing calls into question some of the orthodoxies of composition and improvisation in the classroom which have evolved in several countries during the last fifteen years or so. On the one hand, it is assumed that group work in which the principal medium of exchange is the spoken word is an appropriate means of developing musical thinking. On the other, one notices how information technology is increasingly functioning as the essential prop to the structuring and notation of individual compositions. While there is certainly a place for both these practices in the array of tools a teacher might provide for pupils to utilise, the experience of fostering Harmony Signing has illustrated that creative responses can develop organically without the need for verbalisation, and do so in a context in which co-composers are co-performers who have a shared stake in the product which arises through intrinsically musical processes. The current ambition for Harmony Signing is the creation of a 'spiral curriculum' which provides for the musical needs of participants from the point at which voices can be combined into chords at about 7 years old through to the aural and conceptual education of University and Conservatoire

students. A language of musical communication and representation which combines musical feeling with musical seeing and musical hearing is proposed as a vehicle for the enhanced development of musical thinking, invoking at the deepest level the uniquely human characteristic of multi-sensory simultaneous processing which made possible the evolution of the capacity for art and culture in our species.

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