Auditivity - A Cognitive Style and Psychological Orientation Based On Sensory Preferences For Audition

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Introduction

This study explored specific aspects of verbal and non-verbal auditory life among musicians and non-musicians. It is proposed that this variable differentiates between people on the grounds that adherence to an auditory style may have brought about different psychological orientations and developmental processes. The concept of differences among individuals regarding aspects of their internal auditory life was first proposed by psychoanalysts such as Nass (1971) and Noy (1968) who outlined a cognitive style based on the auditory channel originating from the preverbal infantile stage, whereby the auditory apparatus becomes a primary sensory mode, and leads to an overall auditory orientation. These theories were based, atleast in part, on models of the neurophysicist Charcot who believed that individuals could be differentiated by their sensory preferences, labelling persons as *"visuels," "moteurs,"* and *"auditifs"* (Freud, 1901). However, while psychoanalytic literature may rest on intuitive and interpretative conceptualisations, it is acknowledged that these theories were not developed through a tradition of empirical rigour. On the other hand, the current research premise outlined above has re-surfaced from a different area which touches on internal auditory life - empirical inquiries exploring human foetal existence.

Recent intra-utero research methods (Hepper, 1991; Hepper & Shahidullah, 1992; Lecanuet, 1993; 1996), and infant perception-cognition research techniques (Fassbender, 1993b; 1996; Melen, 1994), offer evidence that the human neonate is predominantly an aural animal. Humans enter the world with specific perceptual acoustic experience from previous intrauterine life, and without a doubt, this prenatal climate rich in auditory experiences influences postnatal human development. For example, it has long since been observed that new-borns exhibit an auditory preference for the human voice, which suggests that prenatal auditory experiences (which contribute to such preferences) may be an unparalleled contribution to postnatal speech perception and development.

Further, many studies (Fassbender, 1993a; 1996; Gellrich, 1993; H. Papousek, 1996; Wilkin, 1993) point to prenatal experiences as the origin of human musicality and ability. Studies continue to demonstrate the fact that new-borns are already sensitive to volume, pitch, harmonic spectrum, and the duration of sound, while infants are capable of processing time-related information and differentiate sounds in terms of duration, pause length, tempo, and relative timing of rhythmic sequences (Pouthas, 1996). In an extensive review of the main research-driven theories on prenatal auditory development, Parncutt (1987; 1993) concluded that the origins of rhythm, melody, harmony, and emotional musical meaning are associated to prenatal correlates, and underlined two common notions: (1) as a result of the wealth of acoustic learning that has taken place while *in utero*, humans command an auditory system that is greatly advanced already at birth; and (2) that sounds heard before birth clearly influence specific postnatal human behaviours.

But, while the concept referred to as *"biological predisposition for musicality"* may infer something about evolutionary requirements of the species and the adaptive significance of

human musicality (H. Papousek, 1996; M. Papousek, 1993; 1996), if children are not sufficiently engaged in meaningful auditory and musical interchanges they may undergo a process of 're-wiring' (H. Papousek, 1993). During the normal course of formal cognitive development, as children learn to pay increasing (and perhaps at times exclusive) attention to the space they see (the landscape), the space they hear (the *soundscape*) becomes muted through impoverished sensitivities. As a result, innate biological predispositions for audition may follow a gradually diminishing course in a visually dominant society. While the majority of children tend not to rely on the auditory mode but rather their visual senses for input and orientation, others might rely on the auditory mode to a greater extent, or perhaps find that they have cultivated a cognitive style that is of equal balance. The aim of the current study was to format these developmental speculations about neonatal predisposition which hint at the conceptualisation of *Auditivity*, into specific behavioural and attitudinal outcomes in order to assess the existence of a cognitive style and psychological orientation based on sensory preferences for audition.

Method

Two hundred fifty-four subjects (N=254) participated in the study; professional orchestra musicians (n=156), and fully employed non-musician controls (n=98). The average age of the subjects was thirty-seven years old (range=18-71), with an almost equal number of males and females, whereby the majority (66%) matriculated at an undergraduate level. Most of the musicians (83%) were players from six contract orchestras in Northwest England within string (63%) and woodwind-brass (28%) sections. The control subjects, also residents of Northwest England, represented the major sectors and vocations of the workforce, including: business-industry (41%), administration-education (17%), and legal-medical professions (12%).

Musicians were contacted through initial letters sent to orchestra halls, followed by questionnaires sent in-bulk three months later. The non-musician controls were recruited through initial individual contacts with the researcher, whereby each subject was enlisted to recruit an additional three or four controls - known as 'chain letter recruitment' or *snowball sampling*. Questionnaires were labelled with PIN numbers and coded (1=musicians, 2=controls) in advance; questionnaires were packaged at random and thus orchestras were not identifiable through PIN series allocation. It is difficult to assess an exact response rate because several orchestra managements reported misplaced, stolen, lost, or accidentally discarded questionnaires. In addition, there was no way to monitor exactly how many questionnaires were actually handed out by the controls. Nevertheless, if responses of musicians (156/500) and non-musicians (98/300) were estimated, these would represent a 32% response rate as the most pessimistic estimate. All questionnaire were returned by pre-addressed FREEPOST envelopes.

Measures

The investigation involved the development of a psychometric survey instrument by Brodsky and Sloboda in 1993 known as the Keele Assessment of Auditory Style (KAAS). KAAS is self-administered in twenty-five minutes, and is designed to elicit self-report information about developmental auditory life as a psychological orientation and cognitive style. The questionnaire survey consists of 78-items and uses a 5-point Likert Scale rating responses from *never* to *always*; an additional option is available to specify *"0"* for items that are *not relevant*, or those the respondent *can't remember*, or *doesn't know*. Sound-related items of a

general nature (items 1-55) are presented according to four developmental ages: infants (ages <5), youngsters (ages 5-12), adolescents (ages 13-18) and adults (ages >18). In addition, items about specific prior experiences involving music activity (items 56-78) are presented according to three critical periods of music involvement: childhood (ages 4-12), adolescence (ages 13-18); and adulthood (ages >18). The items link audition to one or more dimensions of human development, including: learning, memory, motivation, communication, language acquisition, imagination, inner-fantasy, intrapsychic sensitivity to sound, object relations, intimacy, experiencing and expressing affect, perception of self, interactions with others or the external environment, and self-esteem. A few examples of the more general items are...

As a Youngster...

- I felt as if I could experience my emotions far better through music than through speech.
- I preferred lullabies and songs at night time above stories and book reading.
- I was aware that I felt and heard things in music that I could not articulate verbally.
- I was comforted by a familiar tune or melody when sad.

As an Adolescent...

- I felt more comfortable within musical social settings such as ensemble and choir than other social groups.
- I identified myself as having a special gift for music.
- I imagined music in my mind when bored.
- I was aware of the similarities and/or differences in intonation (tone qualities) between my voice and my parents' voices.

As an Adult...

- During conversation I find myself listening or attending to the other person's speech patterns and vocal inflections more than the actual content itself.
- The external sound environment (soundscape) is a major factor for me when choosing neighbourhoods where to live.
- Voice tone is a major influence on whether I am attracted to someone.

Pilot-tests (Brodsky, 1995; Brodsky, Sloboda & Waterman, 1994) demonstrated that a subset of the fifty-five general items produced a 38-item *Auditivity (sub)Scale* which was stable and reliable (Cronbach's Alpha=0.8666; Standardised Item Alpha=0.8718), and provides a scale total score. Further, and although not discussed in this paper, post-hoc Principal Components Analysis (utilising a Varimax Rotation, Eigen Values, and Scree Plots) indicated a four-factor design consisting of thirty-three out of the original thirty-eight items (which demonstrated loadings >0.4), to be the most suitable model to accurately describe the data set; whereby the first factor accounted for 20.4% of the total variance.

Results

The study found that general orientations based on sensory preferences for audition, referred to as Auditivity, among a large heterogeneous population comprised of musicians and non-musicians was widely distributed. The *item mean score* of the Auditivity Scale was spread between 1.66-4.42, whereby the average item mean score was χ=3.08 (sd=0.471). Further, the distribution of Auditivity Scale Total Scores (which are summative of all thirty-eight items) ranged between 63-168, whereby the *mean total score* was χ=117 (sd=17.89). Between-groups analyses revealed large overlapping areas common to both groups indicating that Auditivity is not necessarily synonymous to or a precursor of musicality. That is, not all of those demonstrating high auditivity scores were musicians, nor did all musicians demonstrate high scores. Nevertheless, statistically significant differences were found between the subgroups' mean total scale scores (musicians=122, sd=17.75; non-musicians=110, sd=15.90; t=5.14, df=252, p<.001).

Further, to explore individual differences among musicians concerning psychological/musical development and orientation as based on levels of Auditivity, a median split was applied. Strictly for comparative reasons, and not assuming diagnostic criteria, musicians were classed as belonging to either the lower half (<50%) or higher half (>50%) of the sample in relation to the distribution of Auditivity Scale Total Scores (range=66-168; median=117). It is interesting to note that in-spite of the fact that no significant differences were found between <50% musicians and >50% musicians regarding their general descriptive nature including age, gender, highest level of attained education, orchestra membership, orchestra section assignment, number of students per week, or weekly schedules involving amounts of practise, rehearsal and performance-related engagements, a within-group analyses found that the >50% musicians reported a variety of behaviours from childhood throughout adulthood which were significantly different than those reported by the <50% musicians. This finding compliments an earlier study (Brodsky, Sloboda & Waterman, 1994) which initially demonstrated the existence of significant differences between musicians concerning levels of anxiety as related to Auditivity. Accordingly, musicians scoring higher Auditivity Scale Total Scores were not only more "at-risk," but in fact suffered from Career Stress, Music Performance Anxiety, and Stage Fright significantly more (and to a greater intensity) than did those musicians scoring lower Auditivity Scale Total Scores. Based on the responses of KAAS items about specific prior experiences involving musical activity (items 56-78 which were not part of the general Auditivity Scale), the >50% musicians scored higher than the <50% musicians on twenty-two out of twenty-three items, and these differences were statistically significant on twelve items:

- As children involved in musical activity, the >50% musicians reported that they had more *often* spent time producing expressive sounds on their instruments (t=-250, df=154, p=.014), but only *rarely* attempted to imitate the sounds of nature on their instrument (t=-2.35, df=154, p=.020). Further they more *often* had a certain "feeling of power" when producing some types of sounds (t=-2.60, df=154, p=.010), as well as a "feeling of comfort" while producing other sounds (t=-3.64, 154, p<.001). In addition, as children these musicians attempted to imitate other performers and liked to show off with their instrument more. Finally, they more *often* had feelings of being different from other children who were not learning an instrument.

- As adolescents involved in musical activity, the >50% musicians *sometimes* felt that their parents' approval was dependent on their success as a musician (t=-2.27, df=154, p=.024), and that the degree to which they mastered a piece of music influenced the degree to which they felt some control over their own lives (t=-2.87, df=154, p=.005). As teens, when faced with emotional states involving sadness, loneliness, or apprehension, these musicians more *often* played their instrument (t=-3.87, df=154, p<.001) as a means of coping. They more *often* felt not inclined to become involved with other pursuits because of their intense interest in music (t=-3.12, df=154, p=.002), and that the reason they were never really motivated to overcome the frustrations of peer interactions or academic challenges was because of their ability to escape into their own private world of music and sound making (t=-4.16, df=154, p<.001). As adolescents, the >50% musicians identified more with ensemble players than solo performers.

- As adults involved in musical activity, the >50% musicians *sometimes* felt that by playing their instrument they reconnected with the "child" in themselves ($t=-2.35$, $df=154$, $p=.020$), and that their understanding of another person is *always* heightened if they perform music together ($t=-4.50$, $df=154$, $p<.001$). These musicians more *often* heard sounds in their "mind's ear" when they imagined notation, and felt more psychologically lost when their instrument was masked during full orchestra *tuti* sections.

Discussion

The aim of the study was to explore intuitive theoretic speculations about auditory cognitive orientations and styles, which in light of more recent empirical research-based findings that support evidence of innate human predisposition for sound already at birth, take on a fresh meaning concerning individual differences based on sensory preference for audition. *A priori* acceptance of assumptions about biological predisposition for musicality, predetermined that the study measure levels of *Auditivity along a continuum* (as opposed to *auditive versus non-auditive*). The major finding of the study then, is that Auditivity - a proposed cognitive style and psychological orientation based on sensory preferences for audition - was normally distributed among the general population. This is more than ample evidence that KAAS is not measuring musical ability; some non-musicians of the general public demonstrated the same scores as did professional musicians. Perhaps this is further evidence of human predispositions for sound; while some who retain this predisposition go on to become musicians and even world class performers, others who retain this predisposition go on to become physicians and academics. Nevertheless, and although there is a great area of overlap, as a group musicians clearly demonstrated significantly higher levels of Auditivity than non-musicians.

As the operational definition of Auditivity was based on a stable and reliable 38-item KAAS subscale (derived from fifty-five KAAS items of a general nature), the study took upon itself an exploratory comparison between musicians regarding the remaining twenty-three KAAS items (whose content was specifically oriented towards musical involvement). Comparing between low(er) versus high(er) Auditivity musicians by way of a split-halves analysis, the study found no significant differences between musicians regarding descriptive information, or occupational practices. However, differences between the musician groups were seen on almost all (22:23) of the music-specific KAAS items, whereby on more than half (12:23) of the items these differences were statistically significant.

The weakness of the study rests on developing KAAS as questionnaire survey constructed to explore and assess Auditivity by way of gathering retrospective self-report data; the reliability of information based on biographical memory must be questioned. Further, there is every possibility musicians answered items according to certain self-beliefs and biases whereby they link sensory performance for audition to higher levels of musical ability. Finally, as PCA only indicated a small percentage of the variance accountable to KAAS factors, issues about psychometric properties and construct validity must be raised. Nevertheless, the study demonstrates that sensory preference for audition might be an important yet often overlooked factor of human development, especially where cognitive styles are concerned. Most specifically, where this dimension might be a component of musicianship and motivator towards a music career, the implications of the study are most significant to parents of children, music psychologists, music educators, music conservatories, and least not to musicians themselves.

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