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# Is everyone musical?

## The origins of musicality: A folk psychology view

People vary enormously in their musical accomplishments, with some individuals finding it far easier than others to make progress. Parents often report that one child struggles in vain to master an instrument while a younger brother or sister moves ahead with seemingly little effort. To account for this, folk psychology assumes that differences between people in musical ability are directly caused by inherent biological variability. From birth, some individuals are supposed to have an in-born potential to be musical, or have a natural talent or gift for music, or an innate aptitude for it. Beliefs of this kind are widely held by musicians, music teachers and others, and are influential in helping to decide how limited teaching resources are to be allocated. As one young musician reported:

When I was about six I started getting on; I'd done Grade 2 recorder the year before and my mum thought then that I'd got a gift of music. She wasn't quite sure. And then when I started, when I was a year older and I'd done lots, I did grades in piano and grades in violin. And then she knew I was musical... My mum thought [my sister] has a gift in music but she hasn't, she's got a gift in school work (Howe and Sloboda, 1991a: 46).

A person making a statement like this one would appear to believe that evidence of high achievement forms sufficient grounds for assuming that a gift is present, even though there is no independent evidence or logical justification for such a belief. In reality, all that has been established is that the child's ability to perform has reached a certain level. Nevertheless, a belief in the centrality of innate gifts or talents may seem innocent enough, even if a person's reasons for holding such a belief are inadequate by scientific standards. Self-beliefs exert powerful effects on persistence and mastery at a range of intellectual and artistic endeavours, and differences between individuals in such

beliefs can provide better predictors of future achievement than IQ differences (Dweck, 1986; Vispoel & Austin, 1993). In the above case, it could be argued that because the child has perceived herself as possessing some gift that others do not have, she has been encouraged to be confident of success in her field of expertise. However, there is a less benign corollary: self-fulfilling beliefs about the consequences of an innate gift being present are inevitably coupled with self-fulfilling beliefs about the outcome of a person lacking such a gift. The supposed absence of a specific gift or talent in certain young people may be used as a reason to justify failing to make musical opportunities available to them.

## Is the folk psychology account correct?

If only because of its potential for damaging the lives of those young people who have not been identified as being gifted, it is necessary to ask whether, or to what extent, the folk psychology account of the causes of musical ability is actually correct. There are a number of reasons for questioning the view which attributes musical expertise to the presence of innate gifts or talents.

1. In some non-Western cultures musical achievements are much more widespread than in our own (see, for example, Blacking, 1973; Feld, 1984; Marshall, 1982; Merriam, 1967). Messenger's (1958) account of the Anang Ibibos of Nigeria is representative:

We were constantly amazed at the musical abilities displayed by these people, especially by the children who, before the age of five, can sing hundreds of songs, both individually and in choral groups and, in addition, are able to play several percussion instruments and have learned dozens of intricate dance movements calling for incredible muscular control. We searched in vain for the 'non-musical' person, finding it difficult to make enquiries about tone-deafness and its assumed effects because the Anang language

**John A. Sloboda, Jane W. Davidson and Michael J.A. Howe** argue that the uneven distribution of musical ability in our society is not caused by large individual differences in innate musical gifts and talents. They show that the mental capacities underlying musical ability are more widespread than commonly thought, and that social and motivational factors can account for very wide differences in musical accomplishment.

This is the target paper for a series of peer commentaries by John B. Davies, David J. Hargreaves, John Radford and Bruce Torff and Ellen Winner. Sloboda et al reply on pages 363-364.

possesses no comparable concept... They will not admit, as we tried so hard to get them to, that there are those that lack the requisite abilities. This same attitude applies to the other aesthetic areas. Some dancers, singers and weavers are considered more skilled than most, but everyone can dance and sing well (Messenger, 1958: 20-22).

Cultural factors are clearly important. Western cultures may have unique features that are inimical to the widespread development of high musical achievement. However, even within western society there are sub-cultures in which musical expertise is especially prevalent. They can emerge quite quickly, often as a result of deliberate efforts. For instance, in eighteenth-century Venice, certain orphanages, notably the famous *la Pietà*, established a cultural ambience in which musical expertise was valued and encouraged. Ample opportunities for training were made available, thus creating environments in which a substantial proportion of the orphans became highly accomplished musicians (Howe, 1990; Kunkel, 1985). The fact that the distribution of musical expertise is so greatly affected by cultural factors is hard to reconcile with the proposal that the presence or absence of musical skills in an individual largely depends upon differences in inherent characteristics.

2. Even in our own culture, people normally classified as 'non-musical' do in fact possess many musical skills, with most children acquiring many of the basic skills needed for perceiving and performing music (Hargreaves, 1986). For instance, even without any prior musical instruction, most children are capable by the age of 10 of reaching the same level of performance as musically trained adults at judging which of two musical passages conforms to the rules of tonal harmony (Sloboda, 1985a: 210-3). Receptive skills appear to emerge in the majority of members of a culture through casual exposure to the normal musical products of that culture. The existence of these skills may not be apparent to a casual observer unless the individual concerned has also developed recognizable performance skills.

3. Contrary to common belief, in early childhood the kinds of indicators of later ability that would be consistent with the notion of innate factors being important are conspicuous mainly by their absence. In an investigation of the early backgrounds of notably successful young musicians, Sloboda and Howe (1991) discovered that very few of the individuals displayed any overt signs of musical precocity. Sosniak (1985), who interviewed 24 American concert pianists in their early thirties, found that even after these individuals had been playing

the piano for several years there were few signs to indicate that they would eventually have more success than hundreds of other young pianists.

4. Whilst it may be true that some people find it easier than others to gain musical skills, the common view that certain 'gifted' individuals are capable of effortless progress is contradicted by the evidence. For example, Hayes (1981) found that among 76 major composers whose careers he investigated, hardly any of them produced major works prior to their having had at least ten years of rigorous and intensive musical training. Ericsson, Krampe, and Tesch-Romer (1993) found that the best violinists at a conservatoire had accumulated over 10,000 hours of arduous formal practice by the age of 21, whereas the less able had accumulated only half that number of hours. Becoming a fine musician is not, of course, just a matter of investing in huge quantities of technical practice. The development of an understanding of musical structure and musical styles is also essential, but this too takes time and experience.

5. Although it appears to be the case that musical ability runs in families, inheritance of innate talent is not necessarily the most satisfactory explanation. There is firm evidence that when given opportunities and encouragement to learn, even children whose close relatives have no musical expertise often make good progress. For example, Sloboda and Howe (1991) found that 30 per cent of the pupils at a highly selective specialist music school came from families where neither parent had any musical interest or skill which went beyond simply listening. In the most outstanding pupils, the proportion of non-musician parents increased to 40 percent. It is clearly not necessary for a successful musician to have relatives who are serious musicians.

6. There is a growing body of evidence to suggest that early experience can have a significant influence on musical ability. Musical learning can even begin before a child is born. The fetal ear begins to pick up sounds five to six months before birth (Parncutt, 1993).



Studies by Hepper (1991) revealed that specific pieces of music played to pre-natal infants (via loudspeakers placed on the mother's stomach), were subsequently recognized by the infants when played to them after birth (as evidenced by changes in attentiveness to these pieces as compared with novel ones).

In studies of the early lives of high achieving young musicians Howe and Sloboda (1991a; Sloboda & Howe, 1991) found that many of the parents sang to their children (particularly at sleep time) every day from birth. Many also engaged in song games, encouraging children to dance and sing to music. Because these activities are seen by many parents as 'ordinary' ones, their importance as learning opportunities may be seriously underestimated (Papousek, 1982).

Although there is a lack of research into the long-term effects of early musical stimulation, there is good evidence for the effectiveness of language stimulation (e.g., Fowler, 1990; Whitehurst, Falco, Lonigan, Fischel, DeBaryshe, Valdez-Menchaca & Caulfield 1988), and there are reasons for believing that musical development is subject to broadly similar influences. Our current research is beginning to indicate higher levels of such early musical stimulation in families whose children make the most subsequent progress with music. Taken together, these observations suggest that early differences, possibly incidental and unintended, in exposure to music can lead to substantial variability in children's ability to take advantage of later formal learning opportunities such as instrumental lessons.

7. Folk psychology assumes that there exists some definite set of underlying qualities which differentiates between the innately talented and the untalented. The reality is that musical achievements draw on different combinations of a large number of distinct skills and sub-skills, and correlations between people's performance level at different skills are often low. For example, one musician may be able to pick up a musical score and play it at sight, yet not be able to hear a melody, reproduce and then extemporize around it. In contrast, another musician may have extemporization skills, but be unable to read a score.

One accomplishment, 'perfect pitch', is often assumed to be a special sign of innate musical talent, despite the fact that it is not necessary for reaching the highest levels of musical accomplishment. Perfect pitch is a skill limited to a relatively small proportion of musicians and seems to depend on a particularly systematic exposure to musical stimuli in early childhood (Sergeant, 1969). There is evidence to suggest that with a sufficiently persistent approach, the skill can be learned by any determined

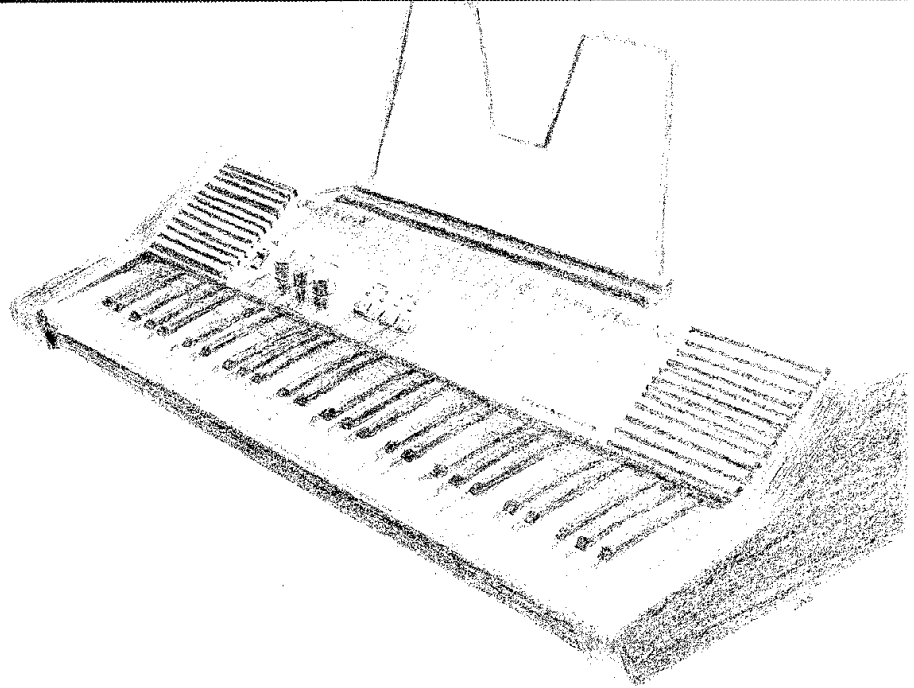
person (Cuddy, 1970; Brady, 1970). Levitin (in press) has argued that most measures of perfect pitch in fact draw on two independent abilities, pitch memory and pitch labelling (the ability to name a remembered pitch). When Levitin measured pitch memory in a task where pitch labelling was not required (singing well-known popular songs from memory), over two-thirds of an unselected sample of college students demonstrated some evidence of perfect pitch.

These seven factors present a cogent challenge to the prevailing folk view. Despite the widespread acceptance of the idea that only certain people are born to be musical, the notion that everyone is musical is probably closer to the true situation. Taking into account the significance of the specific environmental and cultural factors mentioned above, it is clear that the development of musical ability is determined to a greater extent by experience than folk psychology would have us believe.

Whilst we are critical of the notion of innate musical gifts, we are not proposing that individual differences can necessarily be accounted for entirely by differences in experience, learning, motivation or practice. Nor are we denying that inherent biological differences between people may make a contribution to differences in their eventual musical capabilities. It is essential to extend our understanding of the mechanisms and processes by which inherent biological differences exert effects that may eventually influence musical achievements. New approaches to the study of behavioural genetics (e.g. Plomin & Thompson, 1993) offer the promise of more precise identification of genes contributing to psychological differences between individuals. However it is very likely that the links between biology and musical competence, when fully understood, will turn out to be complicated, indirect, not all-or-none, and in no way corresponding to the notion of a unitary 'blueprint for music' that is implied by the notion of innate talents or gifts.

## Why is the folk psychology view so widely accepted?

One reason for the prevalence of the folk psychology account is that the music profession is dominated by it. In other areas of expertise, lay accounts and beliefs are systematically challenged at many points by more scientifically based explanations. For instance, in folk medicine, the common cold is often believed to be something that can be caught from sitting in a draught. Research demonstrates, however, that colds are caused by viruses, and although viruses are airborne, colds



are not caused by cold air currents as such. Virology explains why the folk view has developed (viruses are carried in air), but also highlights the partial and potentially misleading nature of the folk explanation.

In the musical world there is no widespread acceptance of a comparable account, based on scientific research, which could provide an alternative view of how musical ability emerges. Therefore the folk view prevails. Kingsbury's (1988) ethnographic study of an American music conservatory offers insights into the way in which the rhetoric of gifts and talents is given a central place in institutional philosophy and practice. In particular, this rhetoric underpins the assessment of musical performance, which is based almost entirely on the subjective judgements of the instrumental teachers of the conservatory. Their own credentials for making such judgements are ultimately grounded in their own training and performance pedigree, since other professionals, in their turn, have made positive subjective assessments of them. Although there are clearly some objective technical standards below which no aspiring musician can fall, final decisions are not generally open to objective verification in the way that the subjective judgements of, say, tennis experts can be publicly verified by anyone through seeing games being won or lost. Public music competitions are unlike tennis championships in this respect, because it still requires a professional panel of judges to determine the 'winners', and there is ample evidence that such judges can be extremely unreliable. Manturszewska (1970) reports a study in which the panel of a major international piano competition rated a set of performances of the same piece. Without the judges realizing it, the set contained repetitions of the same

performance. Not only was the overall inter-judge agreement low, but some judges gave the repeated piece quite different ratings on the two hearings.

The essential subjectivity of musical assessments within the conservatory would not in itself ensure the dominance of the folk psychology of talent unless it was generally coupled with a reverence for the superior knowledge and wisdom of master musicians. There is a ritual quality to many of the central social acts, such as recitals, in which the music takes on an almost sacred character. According to Kingsbury, the music professors then become 'high priests' of the musical offering, being attributed with the capability to discern the quality of performances, in a way which is not easily challenged even by experts of another instrument or period. From the safety of this professional mystique assessors can, and often do, issue firm pronouncements about the musicality of their students. As Kingsbury puts it:

A person whose playing is said to sound 'mechanical', or 'contrived'... will to that extent be considered unmusical or not talented. A person whose performance is 'expressive' or 'from the heart' and 'with feeling' will conversely be considered to be talented. A person will be judged 'musical' as distinguished from 'accomplished' to the extent that performance was not, or could not have been, determined by self-conscious preparation, such as systematic rehearsing, formal lessons, and technical drills (Kingsbury, 1988: 70-1).

Apart from doubts about whether such qualities of performances are reliably discernible by experts, there is the further problem of attribution error. Kingsbury cites the example of a student who gave a performance which, by her own admission was 'detached' be-

cause of high levels of performance anxiety. Instead of judging the performance to be 'unmusical' for situational reasons, the assessors instead judged the student to be an 'unmusical' person, thus reversing a previous decision made only a year before, with devastating impact on the student's self-image and self-confidence. According to Kingsbury, music professors routinely tell each other and their students that musicality is a fixed attribute - 'you either have it or you don't, and there really isn't anything to be done to change things'.

A second possible factor contributing to the prevalence of the folk account is the way in which the school music curriculum is organized in many Western countries. This has undoubtedly been informed by the professional ethos described above. In many countries classroom teachers of children under 12 are expected (and trained) to teach most subjects. Music is an exception, and is usually taught by a specialist, if at all. Although minimum standards of attainment are usually set in subjects such as language or mathematics, with remedial tuition for those falling behind, there have been no such standards for music. Instrumental tuition has usually been reserved for those who express an interest or are identified by a professional as being talented. The basic music provision that is available to all children can involve little more than supervised listening. It is interesting that in sport, the other area often taught by a specialist teacher rather than the generalist classroom teacher, the notion that some children might be simply spectators has little credence. Everyone is usually encouraged to attain some level of competence as a performer.

A study by S. O'Neill (in preparation) is providing intriguing preliminary evidence that the message implicit in these curricular arrangements begins to be communicated to children at an early age. When 6-10 year olds were asked whether they believed musical and other performance abilities were fixed or could be developed, many children reported a belief that musical ability could not be altered, whereas the vast majority of the same children believed that abilities to play games or sports could be improved with practice.

A third reason for the dominance of the folk psychology of talent may be that the processes by which children begin to differ from one another in musical ability may not be obvious or easily observable ones. Earlier, we pointed out how many foundational musical skills are receptive skills, acquired through exposure to music rather than through overt practice. The rate of learning will depend, not only on the amount of exposure, but also on the degree of attention that the individual pays to the material. This in turn may be affected by a range of motiva-

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tional variables which are linked to music only by a long chain of intermediate factors. It is not difficult to see how two siblings who, from their parents' point of view, have had similar levels of musical exposure, could in fact demonstrate quite different levels of ability when presented with an overt task (such as instrumental performance) for the first time.

A fourth and final reason for the survival of the folk account is that by promoting a positive self-concept in a person identified as talented, it provides that individual with sources of motivation which are pre-requisites to the investment in long hours of practice required to develop musical skills. In other words, the folk attribution gives the musician a *raison d'être*. Because of the rarity of this supposed gift, the possessor of it is set apart as one of the chosen few. Many musicians talk about the gift as something (analogous to the poet's 'muse') of which they may at times be a reluctant recipient, but which imposes on them a duty to develop it, regardless of their transient personal inclinations. The biblical parable of the talents is probably a foundational expression of this world-view: 'a man going on a journey called his servants and entrusted them to his property; to one he gave five talents, to another two, to another one, to each according to his ability' (Matthew 25: 14-30).

### An alternative explanation for differences in 'musicality'

Our challenge to the folk explanation assumes that there are many routes to success or failure, not just one - talent or its absence. Nonetheless we would like to conclude by describing in some detail just one important route which several studies have strongly suggested.

Few people seem to doubt that technical expertise is, at root, just a matter

of hard work; and it is not difficult to see how many of the differences between individuals in such expertise may be accounted for by differences in experience, motivation, and practice. However, as Kingsbury's observations of conservatory culture demonstrate, it is not these technical differences which are normally held to underlie differences in talent. Rather, talented musicians are those who are believed to have superior abilities in the more 'intangible' features of expressive performance (identified by some as 'playing from the heart'). When it comes to such features (the small variations in timing, loudness, pitch and tone quality which transform a piece of music from a merely technical reproduction to an individually distinctive product), there is an implicit assumption that 'gifts', not just hard work, are required.

However, a number of research studies (e.g. Clarke, 1988; Gabrielsson, 1988; Shafer, 1981; Sloboda, 1983) have shown that expressive 'microvariations' are, in fact, highly systematic, both within the same performer and across different performers within a musical culture. Many of these variations have the effect of making important structural features of the music more prominent to the listener, and the nature of such variations can be broadly predicted from general principles of perceptual grouping and organization. These microvariations display essential characteristics of acquired skills: they become more systematic with experience, they can be elicited in situations of unprepared performance (sight-reading), and their application by skilled practitioners is largely automatic. Differences between performers occur not so much because the fundamental principles of expression are different, but because performers have options concerning the distribution and intensity of different expressive devices. Such differences can be characterised as differences in expressive 'style' (Sloboda, 1985b).

Evidently then, despite justifiable doubt about the reliability of professional judgements of 'musicality', there is an objectively measurable continuum of expressive ability, at one end of which are situated musicians who consistently provide appropriate expressive performance in a wide variety of performance situations, and at the other end of which are those who tend to provide unexpressive 'routine' performances. We wish to argue that an individual's position on this continuum is just as likely to be determined by experience as is their technical expertise.

In particular it appears that the development of expressive skill may be significantly influenced by emotional and motivational circumstances accompanying early engagement with music. There is a considerable body of evi-

dence that there are two types of motivation to engage with music, as with any other activity in which creativity may be displayed (Amabile, 1983; Persson, Pratt, & Robson, 1992). One motivation is 'intrinsic'. It develops from intense pleasurable experiences with music (of a sensual, aesthetic or emotional kind) and contributes to the development of a personal commitment to music in and of itself. The other motivation is 'extrinsic', and is concerned with achievement. Here, the focus is not so much on the music itself as on achieving certain goals such as the approval of parents, identification with role models, and winning competitions. Clearly any one individual will have a mixture of both types of motivation. There is evidence, however, that a too early emphasis on achievement can inhibit intrinsic motivation. Children become so concerned about what others may be thinking of their performance, that they have little attention left for the potential of the music to engage their aesthetic and emotional sensibilities.

This conclusion is supported by a study of autobiographical memories (Sloboda, 1990). In this study, adult musicians and non-musicians were asked to recall events from the first ten years of life that had any connection at all with music. They were given a number of questions to stimulate recall concerning, for instance, where the event took place, what event the music was part of, who they were with, and what significance the experience had for them. Many of the musicians reported deeply felt and intensely positive early experiences to the 'internal' aspect of musical events, which seemed to lift them outside the normal state of awareness. For instance, one young woman reminisced as follows:

I was seven years old, and sitting in morning assembly in school. The music formed part of the assembly service. I was with my friends Karen, Amelia, Jenny, Allan. The music was a clarinet duet, classical, probably by Mozart. I was astounded at the beauty of the sound. It was liquid, resonant, vibrant. It seemed to send tingles through me. I felt as if it was a significant moment. Listening to this music led to me learning to play first the recorder and then to achieve my ambition of playing the clarinet. Playing the clarinet has altered my life; going on a paper round and saving up to buy my own clarinet; meeting friends in the county band... Whenever I hear clarinets being played I remember the impact of this first experience (Sloboda, 1990: 37).

Others, more often the non-musicians, recalled events in which the music itself was not remembered as significant in itself, but rather its context, which was often one of anxiety, humiliation, or



embarrassment. Being made to perform in front of others, being criticised, being laughed at, were common experiences.

Frequency analyses of the subcomponents of the recalls showed three factors which were statistically associated with positive internal experiences. First, the event occurred at home, in church, or at a concert hall, rather than at school. Second, the event occurred while the child was listening rather than performing. Third, the child was on her own, with family or friends rather than with a teacher. In each case, these conditions seem to be connected with a relaxed, non-threatening environment where nothing is being asked of the child. It seems that such an environment is necessary for music to work its strongest emotional effects on individuals.

These positive 'peak' childhood experiences seem important for the development of musical ability for two reasons. First, these experiences are so pleasurable that children often increase their engagement with music in the hope of repeating them, thus providing motivation for the very large amounts of practice required to attain high levels of performance skill. Second, these experiences seem to be intimately connected to the person's understanding of the musical structures which are crucial to expressive performance. Sloboda (1991) has shown that adult music listeners identify many of their moments of most intense emotional response with quite specific musical events such as sudden shifts in the musical harmony (for example, enharmonic changes). These events are ones which manipulate listener's expectations in some way. Unless one has experienced the 'delicious' surprise of an enharmonic change through listening, it is hard to see how one could effectively add the appropriate performance expression to such a change to heighten its effect for listeners. Such ex-

pression might arguably be a slight slowing which delays and emphasizes the onset of the unexpected chord. Emotional experience must precede performance. Children who are focusing emotional attention on their performance and other extrinsic factors rather than on the music itself may not be able to build the structure-emotion links that are the necessary foundations of spontaneous expressive playing.

Thus, the musician who plays with technical competence but 'unmusically' may often be the person who has developed an extrinsic rather than an intrinsic focus for musical activity. The absence of an intrinsic focus has nothing to do with absence of 'talent' but the absence of opportunities to learn, by experience, how musical structures affect the emotions.

## Conclusion

The above account demonstrates just one of the many possible routes by which the differing experiences of individuals may have lasting and significant effects on their musical ability. To understand fully the origins of musical ability will require a great deal more research into the lives of developing musicians. However, we hope that we have sketched enough of a picture to show that a preoccupation with simplistic notions of innate gifts and talents can only serve to inhibit efforts to gain a proper scientific understanding of this complex phenomenon.

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## Seeds of a false consciousness

**John B. Davies** looks beyond the 'nature/nurture' debate.

**G**IVEN the middle-class liberalism that underlies much psychological theorizing at the present time, it might seem reactionary to argue against notions which are egalitarian and which spring from the best of motives. But such a stance is not necessarily reactionary. Apparently liberal, appealing and moral notions sometimes contain the seeds of a kind of false consciousness which can manifest itself in unexpected and undesirable ways. For example, the current concern with child abuse has led to the breaking up of families who might sometimes have better weathered the storms and trials of family life left to their own devices; the idea of 'addiction' as a disease removes blame from 'addicts', but also sidelines drug users from normal life and volitional behaviour, and becomes the underpinning for repressive political measures against drug use; and so forth. Without going to such extremes, it is possible to argue that in a small way the current target paper by Sloboda, Davidson and Howe stems from similar roots. If everybody is musical, there must by implication be something odd about those who to all intents and purposes appear not to be, or who actually (perish the thought) dislike music intensely. This could present a problem; rather like not believing in democracy or liking apple pie.

Whilst the particular view advocated in the target paper is beyond reproach in terms of the politics of art and music and the desirability of making beauty and its appreciation available to all, the nature versus nurture debate is (and always has been) a singularly sterile way of making that type of case. This raises the question as to why authors have regularly chosen to cast their beliefs (whether about intelligence, personality, music or whatever) within such a framework. The answer is probably that, because of Western values and views of the world, an empirical or 'scientific' context gives greater gravitas and credibility to one's ideas, even though these may be underlaid by notions which are in fact more moral/political than scientific. There is, of course, nothing new in that; but it means that, whilst we may applaud the sentiments, the arguments presented are not always 'scientific' in the sense that scientists generally construe (rightly or wrongly) that word. It is of course possible to argue coherently that the empirical model of science is totally inappropriate within psychology; but in that case we may not disguise beliefs in the clothes of science in order to sell better our point of view.



*Is there something odd about those who do not appear to be musical?*

Thus, in the Sloboda *et al.* paper, a number of interpretations are suggested which derive rhetorically rather than logically from the data. A good example is given on page 350 where the authors write, 'The fact that the distribution of musical expertise is so greatly affected by cultural factors is hard to reconcile with the proposal that the presence or absence of musical skills in an individual largely depends upon differences in inherent characteristics'. It is not the case however that these things are *impossible* to reconcile, though one is implicitly invited to conclude that they are. But more importantly, the characterization of musical skills as being either 'present' or 'absent' is a kind of sleight of hand whose main virtue is that it defines the genetic argument in a way that makes it easy to argue against. This conception of talent as either 'present' or 'absent' is one of the characteristics of the 'folk psychology' that the authors castigate; yet here they use the same device to bolster their own case. In addition, the authors add plausibility to their argument by apparently confusing population distributions with individual differences. The notion that an *individual's* musical skill 'depends on' the differences between him/her and everyone else is simply not a mechanism. No wonder the genetic idea sounds silly when given this treatment. But if one suggests instead the idea that variation in musicality in a population is underlaid by genetic variability within that population, it doesn't sound unreasonable at all.

A related problem with the Sloboda *et al.* paper arises from a confusion of empiricism with pragmatism. From an empirical view, for instance, one may argue about the status of the genetic evidence and criticize it as part of the

process of suggesting an alternative theory; but one may not, from the same standpoint, criticize the status of the genetic evidence by suggesting that *belief in that theory* is unhelpful due to the possibility of 'self-fulfilling beliefs', or because it may be used as 'a reason to justify failing to make musical opportunities available' (p.349). This is not an empirical issue, but is underlaid by an assumption of 'ought' which has nothing to do with the adequacy of the theory itself. Analogously, one might have argued against the theory of gravity, on the grounds that it could prove demotivating for the Wright brothers. Or less whimsically, that the theory of evolution should be suppressed because of its possible impact on religious beliefs. In other words, these are political/moral issues; notwithstanding the fact that we may or may not endorse the underlying sentiments.

It goes without saying that the converse is true. We may not argue for the truth of a theory by arguing for the psychological advantages of believing in it. Both these issues concern the nature of functional discourse or attribution from which standpoint it is worth quoting from work by Brewin and Antaki (1982), in the context of therapeutic applications of attribution theory:

... the usefulness of the various aetiological models ... lies not in their truth or falsity, but in the ease with which they help clients to reattribute their problems in the desired direction ...

Or in other words, the fact that something has positive effects does not mean that it is true. One has a choice, therefore. One can don the garb of empiricist or of pragmatist, but there are problems if one dons the garb of the one and behaves like the other.



In a broader context, it is surprising that the nature *versus* nurture issue should still be seen as contentious, given the number of times this unresolvable form of the question has been worked over in the past. *A priori* it is difficult to see why the argument should prove any more enlightening in the context of musical ability than it has been in the areas of, for example, intelligence or alcoholism. There may be grounds for arguing a special case for music, on the basis that the genetic theory as espoused by musicians is both self-congratulatory (in attributional terms it makes them into special individuals, rather than mere ordinary mortals who happened to strike it lucky with their environments) and possibly unhelpful from a pragmatic standpoint; but the likelihood of a major breakthrough seems remote from the start. And indeed, this proves to be the case, with the authors to some extent arguing both sides of the case simultaneously. For example, in the introduction they urge the rejection of the idea that differences in musicality arise due to 'large individual differences in supposed underlying innate musical gifts'; this sounds like a clarion call, but tacitly leaves the door open for the possibility (fact?) that less-large differences may be so based. The authors also present evidence that musical abilities are more widespread 'than commonly thought' (by whom?) and that social and motivational factors can account for 'very wide differences (note: but not all) in musical accomplishment'. Reading behind the qualifiers, this is hardly contentious stuff; it is merely presented as though it is. Similarly, evidence that talented individuals have to practice a great deal (p.350) is only weak evidence directed against a straw man; namely the idea that 'gifted individuals are capable of effortless progress'. Does anyone seriously suggest that progress to the highest levels is 'effortless'? A more rational position would be that high levels of achievement require both natural aptitudes *and* hard work. The fact that Linford Christie trains an awful lot in no way supports a theory that we can all potentially run 100 metres in under 10 seconds. On the other hand it may well be the case that a number of other Linford Christies exist whom we shall never hear about, since they have never been brought together with a running track. A fair point.

Because of the impossibility of arriving at anything other than a highly qualified and dialectical conclusion on this topic, the authors use literary devices to give the impression of confrontation where none exists. For example on page 351 we read on the one hand 'These seven factors present a cogent challenge to the prevailing folk view'; a form of words which gives the appearance of a bold and uncompromi-

sing thrust ('cogent challenge') into the vitals of a formidable adversary; but this is closely followed by '... we are not proposing that individual differences can necessarily be accounted for entirely by differences in experience, learning, motivation or practice'. This of course permits the idea that these factors only *partially* account for individual differences. Despite the strong rhetoric, is anyone seriously arguing against this suggestion?

The Sloboda *et al.* paper also relies on a false dichotomy spelled out on pages 349, 350, 352 and elsewhere, in order to generate heat for the argument. People are categorized as either talented or not talented, from which viewpoint one can indeed make the genetic argument (and incidentally the environmental argument also) look quite ridiculous. But genetic orthodoxy now accepts that gene combinations operate within an environment, and manifest themselves differently according to circumstances. It is also uncontentious to argue that, with the exception of simple single-gene characteristics such as eye-colour or copper retention in the liver, complex characteristics are genetically multi-determined, and form continuous distributions within populations. Furthermore any activity, even walking down the street, has to have a genetic basis at some level. So some people will be better equipped than others for the activity, though most will improve with practice. Given this substrate, however, whether they walk down the street or not will be determined by other factors; but other things being equal, some will be better at it than others. Finally, although the latter fact is not in itself an argument for stopping anyone walking down the street, it could be used as such within a particular political context; but that does not mean it cannot be 'true' in empiricist terms. In a word, the whole thing mirrors the genetics-and-educability argument of the early 70s, sparked off by Jensen's (1969) paper in the *Harvard Educational Review*. The same arguments, the same imponderables arise, with 'science' and ethics intertwined in a way that makes it impossible to say where one is supposed to finish and the other is supposed to start; and the protagonists seemingly unaware of the careless ease with which they hop from one to the other and back again.

In summary, the main points arising from the paper concern the bases from which it springs, rather than any deficiency in the specific pieces of evidence cited or the level of scholarship. Indeed, the excellence of the research, which lies behind the arguments is widely acknowledged. However, one is left with a feeling of dissatisfaction about the use to which it is put in this instance; and whilst the characters have changed the plot remains the same. The paper thus

has something in common with certain of the rhetorics described by Billig (1990) within which the semantics suggest that important points are being made, but substantively little is being achieved (see for example the history of the 'risky shift'). What is presented as a fresh controversy simply fails to live up to expectations. Consequently the main point of the paper, namely to encourage the noble idea that variability in musical ability is determined by environment rather than by genes, is disappointing given the extent to which the underlying issues have been debated in the past and the large number of more novel and productive questions that could have been asked concerning music and musicians.

The argument, couched in terms of nature *versus* nurture, cannot be strongly or conclusively won either way through empirical argument alone, (notwithstanding the pragmatic argument that one can do things with environments, but not very much with genes) and as the authors concede, both genes and environment contribute to musical ability, as they contribute to everything else. Given the variable nature of the interaction of these two components of our behaviour, the author's desire to persuade the reader to give pre-eminence to one, and to relegate the other to some dark backwater as insignificant, has to be seen for what it is; namely an ideological commitment driven by egalitarian principles rather than a piece of 'value-free empiricism'. In order to make that point, however, it is not necessary to pretend that the empirical evidence all points in one direction; that the world is full of people who believe that talent is either present or it isn't; nor to short change the evidence that genetic variation has an important role to play in the dialectic that gives birth to musical excellence.

If one wished to make the point that music, the arts, and 'education for the soul' are sadly undervalued in our own increasingly materialistic and self-serving society; or that opportunities to develop the sensitivities required by aesthetic judgement and appreciation are too limited by differences in income, class and education, there may be more convincing ways of going about it.

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# Musical education for all

David J. Hargreaves argues for a broader definition of musical excellence.

**A**LTHOUGH the authors do not directly answer the question they set themselves in the title of their article, their implicit answer seems to be 'much more so than many people think', if we agree with them that the 'folk psychology' view about the innateness of musical giftedness is as widespread as they suggest. Of course, the issue at the heart of their paper is the nature-nurture debate in another new guise, and in a specialized domain in which the mystique attached to putative innate talent may be more pronounced than in many others.

It is perhaps an obvious point, but one nevertheless worth making, that Sloboda, Davidson and Howe's perspective on musical development as represented in this paper is one which is essentially concerned with the specialized expertise which results from high levels of practice and training rather than with what might be called the 'natural' musical development which takes place in the absence of specific training; and for this reason their emphasis on the 'nurture' side of the debate may be particularly strong. As the authors acknowledge, there exist well-documented accounts of the normal course of musical acculturation, and these form an essential backdrop to their own empirical research.

I am very sympathetic to Sloboda *et al.*'s thesis: even if some children are 'less musical' than others, the authors' point of view can only be helpful to those children who are considered to be so, since the implication is that parents and teachers are more likely to believe in the usefulness of appropriate training and stimulation. My own divergence with them stems from the implicit narrowness and cultural specificity of their view of musical excellence: I think that a wider and more realistic definition of this would enable them to state their case much more powerfully than they do. Their *explicit* point of view cannot be faulted in this respect: their first rebuttal of the folk psychology view about innate talent (p.349, point 1) specifically deals with the definition of musical achievement in non-Western cultures, for example, which is cast very widely. Nevertheless, I believe that the content and methodology of their own excellent and widely-reported empirical research, upon which this article is based, and the majority of the illustrations which they use to support their case, reveal a much more conventional view of musical excellence. In this view the highest levels of attainment are essentially seen as part of the tradition of

'serious' Western art (or 'classical') music as taught (in the UK at least) in most music colleges and conservatories: this perspective seriously detracts from the force of the authors' argument.

This implicit view of musical excellence is all the more restricted in the light of the many and extremely rapid changes which are taking place in general school music teaching in Great Britain as a result of the introduction of the National Curriculum in 1988. This has had some profound effects upon music education, which has undergone something of a quiet revolution, and I should like to outline four in particular. The first is quite simply that all children are now statutorily required to study music as one of the 10 subjects of the National Curriculum at all age levels. Hitherto, the likelihood of doing so was a fairly hit and miss affair which depended on the local expertise of particular school staffs: school music for a significant proportion of children was confined perhaps to singing hymns in the school assembly, or taking part in the end of term concert. However, there is now a considerable upsurge in what is variously termed general, non-specialist, curriculum, or class music teaching. Instead of the previous concentration on developing high levels of performance skill in a relatively small proportion of talented pupils under the guidance of specialist musicians and/or peripatetic teachers, the current emphasis has shifted towards *all* children actively taking part in music at some level. All children can participate in and enjoy percussion, singing and other im-

provizional activities, and maybe even work with electronic keyboards with little or no conventional musical training; they can learn to appreciate and listen analytically to features such as pitch, rhythm, harmony, timbre and structure in the pieces they hear; and many new curriculum schemes and music courses for non-specialist teachers are springing up to meet this new demand (see e.g. Mills, 1993).

The second important change is that all children are now required to compose music at all age levels as part of one of the two 'attainment targets' in music ('Performing and Composing', and 'Listening and Appraising'). In spite of the efforts of John Paynter and other like-minded music educators in the UK and elsewhere, this is something which was relatively unusual 20 or even 10 years ago: but pupils who opt to sit the General Certificate in Secondary Education (GCSE) examinations at the age of 16 years are now expected to submit a portfolio of compositions as part of their assessment. (The common, but now obsolete view that musical composition is only for the most talented pupils is another excellent example of the ill-effects of the folk psychology viewpoint: no primary school teacher would argue that painting is only for children with a talent for art!).

Whilst these first two changes relate primarily to children's learning, the third and fourth concern the work of the teacher. The third is that there has been an increasing differentiation between roles within music teaching. In the primary school, it is currently



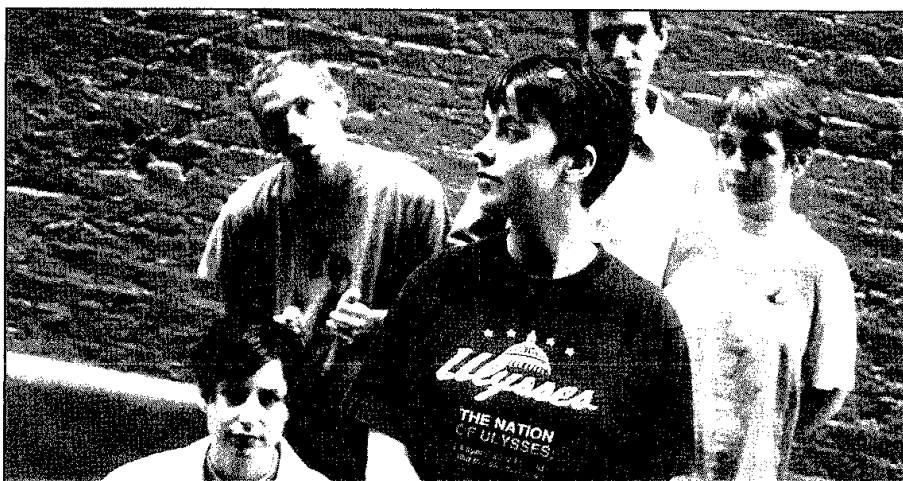
The bands Genesis (above) and Huggy Bear (next page) have very different levels of technical training in music.

possible to distinguish between specialist instrumental musicians with little or no experience of the pedagogical skills demanded by general class teaching; specialist instrumental musicians who do have expertise in class music teaching; general class teachers who have special training or expertise in music, but who are not skilled instrumentalists; and general class teachers with no special training in music, but who nevertheless teach it at primary level. This confusion of roles, along with the fact that both specialist and general skills are demanded by the National Curriculum at different age levels, leads to understandable tensions within the profession.

The increase in general class music has given rise to the fourth change, namely that there is an increasing need for teachers to possess a working knowledge of various forms of popular music, and of the increasingly important and widely-available computer technology by which a good deal of it is produced. Some recent research by my colleagues and I (see e.g. Comber, Hargreaves & Colley, 1993) shows quite clearly that teachers need to be able to cater for a new breed of pupil in the secondary music classroom who is likely to be male, who has had no conventional specialist teaching, who cannot read or write music, but who enthusiastically plays pop music as a spare time hobby, and who is quite likely to have experience with music technology and to possess equipment at home.

Sloboda *et al.*'s account of the way in which the music curriculum is organized in many Western countries (see p.352, para.2) seems to take little account of these recent British developments. The implication of the rise of the non-specialist musician in our classrooms is that 'everyone has the chance to be musical' to a far greater extent than the authors suggest, since the 'classical specialist' view of being musical is not one with which the majority of secondary school pupils will readily identify: indeed, what the authors describe as *intrinsic* motivation is much more likely to develop in those forms of music with which pupils are most familiar.

The extent to which the developments I have described are a particularly British phenomenon is of course open to debate, and the specialist-generalist argument needs to take differences between local and national education policies into account. But a fundamental part of any multicultural music education policy must presumably be that all forms of world music can potentially be given equally serious attention, and that they should be judged according to the aesthetic criteria which are most appropriate in each case. For better or for worse there can be no doubt of the ubiquity of what might most generally be termed popular



Afro-American music, and its spread via the mass media into many countries in the world. It makes obvious sense to capitalize upon this as one important way of making many children 'more musical'.

My point about judging excellence in different musical forms by the appropriate criteria might be taken a stage further. A high level of technical expertise is accepted as an essential prerequisite for professional participation in Western classical music, and Sloboda *et al.* point out that the ways in which this is employed by different performers can be pinned down with remarkable precision, as in the identification of 'expressive microvariations' in performance. Whilst certain performers in different forms of popular music undoubtedly possess equivalent levels of technical expertise, however, many do not; it is by no means essential for a successful career. The technical skills of Bob Dylan or John Lennon were rudimentary by classical standards, yet few would deny that these two musicians produced work which has had a profound impact on a whole generation, and whose influence can still be felt. Even in the field of jazz, where high levels of expertise are undoubtedly essential, there are those who would argue that the technical command of musicians like Thelonius Monk or the early Miles Davis was strictly limited in comparison with many of their peers, and yet the influence of their innovations upon the work of subsequent musicians has been immense.

There are of course important differences between the evaluation of the creative originality of popular songs or jazz improvisations, in which new structures are being created, and of variations between performances of written classical pieces which involve a relatively circumscribed set of notes. It could be argued that the influence of the popular musicians mentioned above is just as attributable to their social and cultural significance as to their musical innovativeness, and that a more appropriate comparison might be with

'classical' composers than with performers. Nevertheless, a satisfactory answer to the question posed by Sloboda *et al.* needs to emerge from a wider perspective than that which is implicit in their article: to have attempted to have done so would have been to make their case much more convincingly.

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## Variations on a musical theme

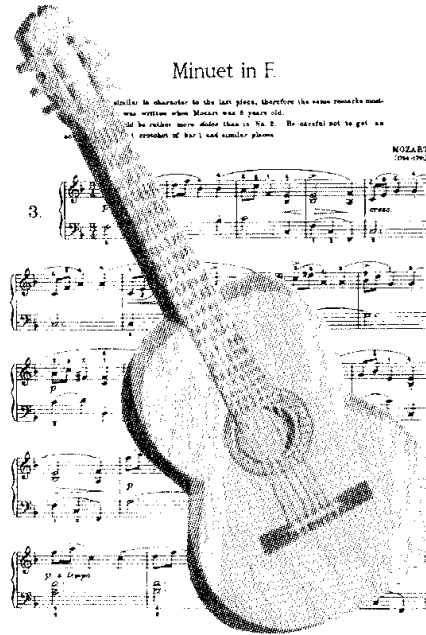
**John Radford** explores why, although all could be equally musical, some would be more equal than others.

AS THE three authors (henceforth SDH) suggest, the obvious answer is no: there are at least some individuals who appear to do nothing that could be called musical. But even this may be misleading. W.S. Gilbert is said to have remarked of his own lack of musicality that he had once succeeded in distinguishing 'Pop goes the weasel' from 'God save the Queen'. But he did write highly settable lyrics, thus showing at least one musical component, rhythm.

If this were a seminar topic I should probably irritate students by constantly asking: What do you mean by ...? Does 'is' mean actually, or potentially? Does 'everyone' mean every single person, or Homo sapiens as a species? Is it to refer to all times and places, or our own? And what are we to understand by 'musical'? We might or might not want to include both musical productivity - actually playing or composing, etc. - and sensitivity or appreciation. Presumably (as SDH point out) musicality exists as a continuum of ability and a spectrum of components: how much and how many are to count as 'musical'? There is also a range of activities such as playing, singing, dancing, which in classical usage, as so often, tend to be sharply differentiated, but in folk art are much less so ('ballad' has the same root as 'ballet'; is dancing musical?).

SDH's argument may perhaps be summarised thus. There is a 'folk' belief that musical ability is not universal, but is some kind of 'gift' possessed by a relative few. There is evidence to the contrary - they list seven sorts - which suggests that musical ability is determined more by experience than folk psychology has it, although there certainly are genetic components. There are reasons for the existence of the folk belief, and there is an alternative view, which sees musicality as more akin to skill, which can be acquired. I will offer some comments on what is said in the course of this argument, and then some more general points.

A folk belief can be considered as what is often called a 'lay theory' and its definition and distinction from a 'scientific theory' are by no means simple (Furnham, 1988). In the present case the evidence for it (certainly that offered by SDH) seems to be largely anecdotal - although I think convincing. SDH seem to suggest that the lay theory of ability being restricted in some way, such as being innate in some individuals, is peculiar to music. Anecdotes however can be



found elsewhere, thus: 'By definition, talent in games cannot be nurtured by experience of life; it has to be inborn, and it is limited in supply.' This strange remark appeared in *The Times*, 30 August 1993, over the name of Lord Skidelsky, often quoted as an authority on education. SDH suggest that the folk belief may damage individual development. However, if we all potentially had all talents, we could hardly develop more than a fraction of them, so the inhibition of one would not matter much.

One sort of evidence offered by SDH against the folk belief is that musical achievement is much more widespread at some times and places than others. One could cite in agreement examples much nearer home than they do, for example the enormous upsurge in home-produced pop/rock around the 1960s, and the smaller, but even more do-it-yourself burst of traditional/folk music. All of a sudden one found people of every kind singing or playing quite unselfconsciously in a way that seemed to have been lost for ever. Alas, commercial pressures soon got the upper hand once more. Fashion can have marked and quite specific effects: James Galway has greatly increased the demand for flutes and the World Cup *Nessun dorma* that for opera. Another sort of evidence is that early indicators of ability seem to be often lacking in those who are later highly able. This seems somewhat unusual, and it appears that the particular samples quoted did not show no ability when young, but simply no more than others who did not go on to be out-

standing. Indeed the next piece of evidence cited by SDH refers to the amount of practice needed by successful musicians. If future musicians typically begin on this when young, they must presumably already be showing some ability.

Then there is the fact that talented musicians quite often come from 'non-musical' families. But as I have suggested, this is a difficult thing to determine. 'Simply listening' (SDH) may well imply considerable musicality. And SDH's next point stresses the role of early experience in developing musical ability. Most early experience normally centres on the family. Practice is by way of being flavour of the month, or decade, stemming from the quite dramatic work of K. Anders Ericsson and others (e.g. Ericsson, Krampe, & Tesch-Romer, 1993). SDH, however, do not claim that it is more than a necessary condition. And recent genetic theory (Lykken, McGue, Tellegen, & Bouchard, 1992) suggests that talent may be an emergent trait, depending on a particular configuration of genes, any small difference in which will result in markedly different behaviour. This could accommodate both the 'non-musical' families of musicians, and the Bach family. The sixty-odd musicians in this family are often cited as evidence for environmental factors, but if these were so favourable one has to explain why there was only one Johann Sebastian.

Overall I tend to agree with SDH as regards the evidence although, quite justifiably in this context, they make the very best of it. The same thing applies to the suggested reasons for the folk belief. Anecdotally, one might support this with what appears to be a British love of fixed classes - social, academic, etc. - and dislike both of specialization, e.g. in government, management etc., and of the arts generally - despite, paradoxically, producing so many great exponents. As against this, SDH quote evidence for the folk view from the USA, where all children in public schools have the opportunity to learn an instrument (Fortney, Boyle, & De-Carbo, 1993).

More generally, one might suggest that a devil's advocate could turn the argument on its head and hold that the more an ability is widespread, the more this suggests a hereditary origin for it, requiring admittedly the right circumstances to develop it. Even the genetic components for physical traits, however, will react differentially with varying environments. For behaviour,

all that can be inherited is potential. Abilities, as Ryle argued convincingly back in 1949 in respect of intelligence, are not causal entities, but only summaries of behaviour, and (human) behaviour is essentially cultural. Musical behaviour can certainly not be understood apart from its context, as has become well recognized in respect of folk music (Pickering, 1990). But it is not that the potential for behaviour is popped into a cultural environment like a seed into a seed-bed; it is that individual and culture are interdependent; neither can be defined without reference to the other (Schweder, 1990); 'man makes himself' as John Blacking (1973) put it, in answering SDH's question far more brilliantly than I can. Music is a human activity, culturally created and defined, and musical ability refers to degrees of prowess in carrying it out: differentiation of individual ability is part of the definition. Everyone could not be *equally* musical, even though the potential is species specific, as Blacking argued.

Music has a variety of functions, or reasons why it takes place, which vary from time to time. Some of the main ones are, ritual, work, social, ceremonial, aesthetic and perhaps a catch-all 'entertainment'. They are often not sharply distinguished: musical events currently usually have at least social and aesthetic functions (even solitary headphone-

listening). Work functions on the other hand have largely disappeared in technologically advanced societies. Once it was said that 'if the men don't sing well, the ship don't work well'. One would be surprised to hear sailors sing today - though A.L. Lloyd would sometimes insert in a folk club shanty the line 'Get this damn evening over, boys!' (to me way-hey-hey-hurrah, etc.). Classical art tends to emphasise the aesthetic above all (see Gifford, 1988), but this is a limited view of what people actually do. It is plausible to suggest that the wider the function, the wider its musicality. In the strictly non-instrumental worship of Highland Gaelic churches, every member of the congregation would sing, simultaneously, but with individual variation, after the precentor gave out the line - a unique sound (Collinson, 1966).

Such communal activity is diminishing, and with it many forms of musical activity; and I should want to say that non-participants are to that extent less musical - not that they are as it were musical, but frustrated. On the other hand sales of sheet music, serving various functions, continue to increase, and the users of it are correspondingly more musical. I see no reason to doubt that in a society in which musical activity was general, all would equally be musical, though some, of course, would be more equal than others.

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# Don't throw out the baby with the bath water

**Bruce Torff and Ellen Winner** look at the role of innate factors in musical accomplishment.

**E**CHOING controversy in other domains, debate rages in the developmental psychology of music concerning the extent to which musical skill is attributable to innate or environmental factors. Sloboda, Davidson and Howe argue strongly against innate factors. They decry the 'folk psychology' prevalent in Western society which attributes the uneven distribution of musical ability to individual differences in underlying innate musical 'talent'. Rather, the authors claim, the 'mental capacities underlying musical ability are more widespread than commonly thought, and social and environmental factors can account for very wide differences in musical accomplishment' (p.349).

We agree with the authors that the folk psychology of talent is inaccurate and has had certain pernicious repercussions in music education. Typically, subjective means of assessing musical ability form the basis of decisions to focus educational resources on those deemed talented, excluding students who may possess musical abilities untapped by the assessment measures.

But the authors have gone too far in the opposite direction. They give excessive credit to experience, exposure, and practice, and virtually deny the importance of inherited differences in musical aptitude. While we agree that a belief in talent to the exclusion of environmental factors is wrong, we find it equally wrong to deny the important role of innate ability in musical accomplishment. Have Sloboda *et al.* thrown out the baby with the bath water?

Sloboda *et al.* advance eight arguments in support of their view that environmental factors account for all major differences among individuals in musical accomplishment. We first discuss each of these arguments, and then consider the kinds of evidence that would bear on the claims made by Sloboda *et al.*

1. The authors hold that high achievement is not in itself evidence of innate talent. According to this argument, all that is required for exceptional performance in a domain is a belief that one is gifted. Such a belief, they argue, leads to the kind of confidence that is in itself enough to lead to mastery.

The authors base this claim on the fact that self-beliefs are better predictors of achievement than IQ differences (Dweck, 1986). However, IQ differences are known to be indifferent predictors of success in anything besides school



performance (e.g. Gardner, 1983; Sternberg, 1977). To substantiate their claims, the authors would need to call upon evidence showing that self-beliefs in one's musical ability are better predictors of high performance in music than are legitimate tests of musical aptitude. We doubt that the evidence would support their claims. Moreover, we suggest that individuals do not normally come to believe they are gifted in music (or any other domain) unless they find learning easy and enjoyable and notice that they make progress above and beyond that of other individuals - i.e. unless they in fact have an above average talent in the domain.

2. The authors use the indisputable fact that in some cultures musical skill is more widespread than in others to reject the hypothesis that musical skill depends largely on innate differences. However, this conclusion does not follow. All that we can conclude is that individuals in our culture do not fulfil their potential. We think that this is undoubtedly true, not only in music but in all areas of expertise. However, this does not mean that there are no large inherent differences in individual potential. The fact that we can all perform in some domain at a higher level than we do does not mean that we can all reach the same level. The same is true of a physical trait like height: with different nutrition we could all be taller, but some of us would still be much taller than others.

3. To make the claim that we all have the same inherent musical abilities, the authors argue that ordinary Western children have receptive musical skills equal to those of musically trained

adults. The evidence for this is that by the age of 10, most children can judge which of two passages conforms to the rules of tonal harmony. Similarly, we know that ordinary children can make fine discriminations among painting styles. Would we want to conclude from this that we can all be Picassos? Surely not. High levels of expertise in music (or art) require much more than such fairly low level receptive abilities, such as, for music, the ability to respond to subtle shifts in key, the ability to recognize musical forms, etc.

4. The authors make the surprising claim that successful musicians do not display musical precocity in childhood. They cite Sosniak (1985), who found that concert pianists displayed few signs as children 'that they would eventually have more success than hundreds of other young pianists' (p.350). However, we suggest that this does not mean that these pianists as children showed no more ability than children selected at random and given piano lessons. Moreover, the authors seem to ignore the many reports of extreme precocity in musical prodigies (e.g. Yehudi Menuin; E.N., studied by Revesz, 1925; Mozart; see Winner & Martino, 1993). It is strange that these well known examples are not included in this article.

5. The authors dispute the view that some individuals are capable of effortless progress in music. We agree that it would be preposterous to suggest that intensive training and practice are unnecessary for becoming a musician or a composer. However, the assumption that anyone who works hard and regu-

larly can become an expert is unpersuasive. Children differ enormously in their potential to pick up, retain, and manipulate musical information. This is true in domains besides music. For example, consider the difference between children who teach themselves to read and those who must work at it for years - or the difference between children who discover mathematical relations on their own, progressing faster than those in their class, as opposed to those who learn with difficulty only what their teachers present to them over and over again.

As the authors themselves admit, some people find it easier than others to gain musical skills. If one observes children learning to play the piano, one cannot avoid noticing that for some children progress is halting, and time at the piano is painful, while for others with the same teacher, progress is rapid, and time spent at the piano is at least sometimes pleasurable. Children not only retain music lessons differentially, but they also use different strategies. A child who ferrets out the organization of the harmonic structure, and can transpose from one to another key, has entirely different options from one who must remember pieces slavishly and cannot make shrewd guesses. So too, for those with a heightened maths-number or linguistic sense.

In addition, the notion that superior pianists have spent more time practising than less skilled pianists does not mean that it is amount of practice that has led to their superiority. What keeps a person at the piano (or the chess board, or the computer keyboard) for hundreds or thousands of hours? It is not just the whip. Children persist in domains which they find pleasurable because they learn easily and move forward rapidly. One could not compel a child without significant skill in music (or chess or maths) to spend so much time in daily drill. The child would resist. Indeed, those who work at something for thousands of hours are a highly select breed to begin with. They are not simply ordinary individuals who have worked slavishly.

6. The authors buttress their claim that innate factors are not important by noting that a child need not have musicians for parents to become a successful musician. We agree that this is true, but this does not lead to the conclusion that there are no inherent differences among children. First of all, a non-musician parent may have undeveloped musical aptitude. But even a child of two completely unmusical parents can possess an unusual biological

proclivity for music, due either to recessive genes, or to the effects of the hormonal fetal environment on brain structure (e.g. Geschwind, 1984).

7. The authors point to evidence that early experience significantly affects musical ability. They suggest that early musical stimulation leads to musical skill which in turn prompts parents to initiate formal musical lessons. These children then demonstrate musical accomplishment, while children lacking early musical stimulation never reveal their potential and thus never are given music lessons. We agree that musical stimulation may well promote musical skill, but there is no reason to assume that all children benefit equally from such stimulation. The authors make an analogy to language, arguing for the importance of language stimulation for language learning. But differences among children in speed of language acquisition are minuscule in comparison to differences among children in musical performance. Moreover, most researchers in the field of language acquisition unequivocally reject the claim that the environment plays anything but a triggering role in language acquisition (e.g. Chomsky, 1975; Pinker, 1994).

8. The final point made in the paper seems to encompass several points. The authors note that there are many components of musical skill, and that musicians do not always show equal mastery of all of these components. Some may be good at sight reading yet not be able to improvise, for example. The fact that musical ability is not 'of a piece', however, does not bear on whether the individual components are biological or environmental. The authors then go on to argue that one component of musical skill, perfect pitch, is not only not necessary for high performance (we agree), but also can be learned 'by any determined person'. However, the fact that over two-thirds of a random group of college students show 'some evidence of perfect pitch' (as measured by pitch memory, not pitch labelling) does not mean that some children may not be inherently better than others at pitch memory and labelling. While it is true that training may lead to perfect pitch, some children demonstrate perfect pitch in the absence of explicit training, astonishing their parents (Winner & Martino, 1993).

Verification of Sloboda *et al.*'s (1993) argument would require a study in which the influence of environmental conditions is held in control, allowing underlying levels of musical ability to be isolated and tested. In a possible study, one might train a random sample

of children at age five - before the typical age at which children are identified as talented in music and instruction is introduced. Children could be given musical training held constant in quantity and quality. After a certain amount of training, subjects would be asked to respond to a series of assessment measures designed to examine a range of valued skills in musical production and perception.

To the extent that individual differences were found in how children learn - how easily, how rapidly, how much they discover on their own - we would have to conclude that innate differences in proclivity or potential are at work. If all the children performed in a fairly similar manner, Sloboda *et al.*'s (1993) hypothesis would find support. Only through such a controlled experiment can we empirically test whether the influence of innate factors is as negligible as suggested.

We conclude with a small thought experiment. Imagine a pool of 100 children selected at random, who have never played or watched chess. Suppose these children are given identical chess lessons one hour a day, and play 100 games against their teachers. Would anyone genuinely expect all of these children to be playing at even approximately the same level at the 101st game? We suggest that some children will quickly master what they are taught and go on to discover sequences of moves and optimal positions on their own; others will master what they are taught but no more; and still others will have difficulty retaining even a modicum of what they were taught.

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# Musicians: Experts not geniuses

**John A. Sloboda**  
**Jane W. Davidson**  
*and*  
**Michael J.A. Howe**  
*respond to the peer  
commentaries.*

**W**E FIND it a matter of scientific interest and social concern that so many people adhere to a strongly determinist view of musical ability. This fact seems to us to justify our public airing of the issues, if only to make it clear that the weight of evidence does not support the fatalistic views about musical achievement that many people still endorse. Indeed, more people are prepared to attribute low achievement in music to lack of talent than in other activities such as sport or academic work, and we have cited evidence for this. Our main quarrel is with the determinist assumption that there are innate gifts which function as blueprints for musical ability. Folk psychology is in error in making the assumption that individual differences in human capabilities which are partly inherited are necessarily immutable. Ability can be highly heritable in a population and yet show dramatic changes for an individual who undergoes intense training, with heritability denoting probabalistic genetic influence for a population rather than predeterminism or immutability for an individual (Thompson & Plomin, 1993; Plomin & Thompson, 1993).

The responses to our article raise a number of important issues, but some of the comments misrepresent central elements of our position. We do argue that the development of musical ability is determined to a greater extent by experience than folk psychology would have us believe, but we do not deny the importance of inherited differences between people, and we note that it is essential to extend understanding of the mechanisms and processes by which inherent biological differences between people influence musical achievements. It is significant that none of our commentators cites a single piece of scientific research which either demonstrates strong genetic determination of variations in musical accomplishment or identifies the manner in which

possible genetic influences might exert their effects. To our knowledge, no such evidence exists. We, on the other hand, have cited research studies which demonstrate clear effects of experience on musical ability and, equally importantly, suggest, at least in outline, plausible mechanisms through which these effects are mediated.

We agree with John Booth Davies that musical ability grows out of our inherited characteristics, just as does the ability to walk. The potential for advanced musical activity must be genetically underpinned in a species-specific manner. But our claim is that such potential exists in almost every human being, and that the differences between any two individuals in this genetically determined potential are not necessarily relevant to an explanation of why they differ in actual musical achievement. We certainly do not deny the possibility of genetic contributions to variance, and nor do we wish to assert, as John Radford suggests we do, that everyone is equally musical. We do believe, however, that there is no compelling evidence to suggest that more than a small minority of people lack the potential to acquire the skills necessary to, for instance, be a proficient orchestral player. Whether all of us have the potential to achieve at the level of a Mozart or a Picasso is quite another question, and one which our paper does not deal with. Unlike those with creative originality who 'challenge the domain as it is customarily structured and practised' (Gardner, 1993), skilled experts work within the parameters of an existing domain. Our paper relates entirely to the skilled expert. The references to creative geniuses which are made in some of the commentaries seem to us to be diversions from the main issue.

Bruce Torff and Ellen Winner make the perceptive comment that to substantiate our claim - that exceptional performance follows from the belief that one is gifted



- we would need to call upon evidence showing that self-beliefs in one's musical ability are better predictors of high performance in music than tests of musical aptitude are. Studies involving precisely these comparisons are under way in two countries under the supervision of one of us (Sloboda), but in interpreting the findings we shall have to take account of the fact that scores on musical aptitude tests may reflect prior learning as much as raw potential. As Sosniak's (1990) study of exceptional young pianists makes clear, a child's belief that she has a special aptitude or talent typically precedes the emergence of skills that are actually exceptional. Of course, we do not think that a belief that one is gifted is all that is required for exceptional performance, but we do suggest that such a belief can help someone to become sufficiently motivated to invest the long hours of practice needed in order to develop musical skills.

The fact that children differ in their ability to pick up, retain, and manipulate musical information is regarded by Torff and Winner as justifying the belief that children differ in their potential to do these things. But no evidence is cited for this view, which seems to be just another restatement of the dominant folk psychology, as does their claim that 'those who work at something for thousands of hours are a highly select breed to begin with. They are not simply ordinary individuals who have worked slavishly'. This assertion is contradicted by considerable evidence showing that ordinary people can achieve outstanding accomplishments through extended practice (Ericsson, Krampe & Heizmann, 1993; Chase & Ericsson 1981). We agree that children who practise for thousands of hours are highly select, but it does not follow that they must have been so to begin with.

Torff and Winner also ask us to imagine a study in which a large number of five-year-old children all have equal exposure to identical musical training. According to Torff and Winner, our arguments would be supported only if all the children performed at a similar level after such training. This is wrong. We would expect there to be substantial differences between children in eventual outcomes as a result of differences in the amount of previous learning (which, as our paper showed, can begin even before birth) as well as differences in preferences and interests, temperament, attentiveness, self-confidence, and any of various other influential attributes.

David Hargreaves argues that the current musical education situation in Britain is in some respects less bleak than we have painted it, and believes that our case might have been made more convincingly if we had examined other types of musical achievement than 'serious' western art music, for in-



stance, folk, pop, and jazz, and recent developments in British classroom music. We are inclined to believe anecdotal stories of children who present as low achievers in 'serious' music while at the same time showing high levels of achievement in other musical domains, although we are not aware of systematic research on the issue. However, Hargreaves' reading of our view of the role and origins of expressive performance is not quite as we had intended it to be interpreted. Expressive performance can be improved through practice, but it is a separate skill from the technical expertise which allows difficult pieces to be played rapidly and accurately. It may be precisely because some idioms (such as jazz) require less technical expertise than others (such as the romantic piano concerto) that one can find jazz masters who are not technically outstanding. Like Hargreaves, we regret the cultural elitism which has focused most academic enquiry of all sorts on the 'high' classical music tradition at the expense of everyday idioms. It is this elitism which, at least in part, may be responsible for the existence of the folk-psychology of music. As all the commentators indicated, in their different ways, the re-integration of musical activity into the everyday life of western culture is highly desirable and may eventually change cultural conceptions of musical ability.

Davies suggests that our arguments are not particularly contentious and that we try to create the impression of being more controversial than we actually are. Regrettably, we do not have to pretend that the world is full of people who believe that talent is either present or it is not. Davies should try talking to a few musicians! Therefore, we are not ashamed of adopting a position which

goes beyond what is scientifically certain. As psychologists, we have ethical and social responsibilities as well as scientific ones. We believe that there are immense pragmatic benefits in 'deconstructing' the brand of folk-psychology which proposes inherent musical gifts.

Additionally, it is not clear to us why Davies feels that we are invoking the very folk-psychology we reject by suggesting that (as a consequence of certain causes) particular skills may be present or absent in a person. Skills can be observed to be present or absent; talent cannot.

We share John Radford's frustration at the fact that some of the words which appear in a discussion of human abilities are ones that do not have one single clear meaning or definition. In some ways we would prefer to avoid using a word like 'talent' at all, not only because it means different things to different people but because simply by introducing the word one appears to be making certain assumptions about the existence of a causal entity. Because everyday discourse is permeated with folk psychology assumptions, there seems no way to ensure that the communicative functions of ordinary language are maintained, and at the same time only permit those terms that have just one clear meaning and are entirely free of implied preconceptions.

Human abilities do not just happen. There must be causes, and both biological mechanisms and differences between individuals in their experiences contribute to the causes. Saying that a person is talented or gifted, or innately or inherently musical, is all too often seen as a justification for ceasing to look for causes, in the mistaken belief that they have already been discovered.

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