The Psychology of Music

John Booth Davies

1978

Stanford University Press
Stanford, California

1 Psychology and music

This book is principally concerned with some of the facts, fantasies and speculations that have emerged as a consequence of the scientific study of music. The application of the scientific method to topics within the general area of aesthetics is by no means the only useful approach, and, as we shall see later, it does not meet with universal approval. On the other hand, much of the work on aesthetics is of a highly subjective nature, and frequently confuses empirical fact with pure opinion. Many of the so-called musical laws, for example, are not laws in the physical sense (e.g. the law of gravity) but are conventions (e.g. laws of harmony) which musicians have simply agreed upon. Furthermore, whilst the scientific study of music might with some justification be seen as a rather dull, unexciting and concrete-minded thing to undertake, in the sense that it has none of the beauty or poetic appeal of the actual subject matter, it can serve a very useful purpose in exposing certain beliefs as pure mysticism; hopefully, in this process, making such things as 'good taste', 'sensitivity', 'musical understanding', and so on, into comprehensible entities common in varying degrees to almost all people, rather than magical properties of some sort of musical priesthood.

Close contact between the author and musicians from all walks of life has revealed that the world of the professional musician is indeed more down-to-earth than many of us would perhaps believe. Consider the following extract from a diary of Franz Schubert: 'Thus beautiful impressions remain in the soul, which are soothing to our existence, and which neither time nor events can efface. In the darkness of our life they throw a light, bright and beautiful future, which fills us with fervent hope. O Mozart! Immortal Mozart! How many, yea, innumerable impressions of a brighter and better world have you imprinted on our souls.' There can be no doubt that this passage is a true attempt on the part of Schubert to express his feelings about the works of a very great composer, and there is no intention here to belittle them. There is a danger, however, that such powerful sentiments become a model for the way one ought to feel about Mozart, perhaps even accompanied by the belief that this is in some absolute sense the right way to feel. Contrast the above extract with the following incident which occurred when the author encountered two members of a nationally famous symphony orchestra in a Glasgow pub, shortly before a concert. The question 'What's on the programme tonight?' elicited the baleful reply, 'Bloody Mozart'.

These two reactions to Mozart are equally valid, and, more important,

potentially equally explicable. If we know sufficient about the people who expressed these opinions, about their states of mind, and about their styles of life, both reactions become in some way more logical. Thus the first extract can be seen as the outpourings of a shy, retiring, and extremely sensitive individual, who in his overt behaviour is reputed to have been undemonstrative, and who perhaps expressed his inner feelings covertly rather than overtly. (It is said that when he visited Beethoven shortly before the latter's death in 1827, he simply stared at him for some time in silence before bursting into tears and quickly leaving the room.) The latter statement, on the other hand, represents the reaction of an overworked orchestral musician who has played a particular composition many times in the past, and who frankly doesn't want to play it again. It is, furthermore, not merely the opinion of someone who is musically unskilled, uninformed, or insensitive (the same musician goes into ecstasies about Sibelius). Neither of the two statements is 'right', but both are equally valid indicants of the reactions of two different people, in different sets of circumstances. The conclusion should be clear. **Regardless of what critics or experts say about the way a piece of music 'is', it is in fact all things to all men.**

In the past, many books about music have appeared, but in some cases there is a lack of clarity about what is fact (i.e. that which is shown to have objective support in empirical studies, and which is also verifiable by such means) and that which looks like fact, or is described as though it were fact, but which is based on opinion or evaluation. There is clearly plenty of room for both modes of treatment, but the blurring of the distinction between the two has some unfortunate consequences. This issue is admirably, and uncompromisingly, dealt with in Berlyne (1971). This writer sees the objective study of aesthetics as having been persistently impeded by the failure to distinguish between normative and factual questions. Furthermore, Berlyne points out that the writings of psychologists and others, on artistic topics, frequently suffer from the intrusion of artistic values and preconceptions. Too often, he claims, writings in the area of aesthetics serve not merely the function of objective analysis, but also serve the desire of the writer to demonstrate that he is a man of culture, taste and sensitivity, who can tell the difference between good and bad art. If, for example, one wishes to illustrate a point with an example, and equally good examples are available from Berlioz's 'Symphonie fantastique' or 'Roll out the barrel', the tendency has been to choose the former, even though relatively speaking hardly anyone has heard of it.

Music, and to a large extent the other arts, have also acquired a supernatural or mystical quality which tends to make any analysis of these activities seem sacrilegious, especially if it is seen that the standpoint for such analysis is fundamentally the same as that adopted in studying the operations involved in putting sardines into tins. This mystical quality may conceivably be an example of extended cultural lag, and have its roots in the association between music and religious ceremonies during early times. Certainly, there is much evidence of close association between music and religious practice from many epochs

and many parts of the world. One may therefore feel a certain uneasiness about dismissing a particular piece of sacred music as boring or tuneless without first knowing how the Almighty feels about it. The fear of many musicians would appear to be that a scientific analysis of music will in some way render it less wonderful than it was before, and that its magical quality will be in some way diminished. This is not the view taken here.

In historical terms, the position of the creative artist has frequently been a rather elevated one. Mankind is seen as reaching its highest pinnacle of achievement, and hence being most godlike, when involved in the act of artistic creation. Although perhaps today only a few people would make such an extravagant analogy, the feeling that there is something special about music and musicians persists. And of course there is – but this 'specialness' lies not in terms of metaphysical entities or magical qualities, but in terms of processes and forms of behaviour which are actually or potentially amenable to precise and objective description, and which are, in theory at least, explicable ultimately at a physiological level. Such an approach by no means denies the importance of social influences upon musical performance, or upon musical preference either. Clearly, one's musical tastes are to a considerable extent influenced by the musical tastes of one's family and friends, one's workmates, one's peer group and so on. None the less, social cognitions, like musical cognitions, are not metaphysical or magical in nature, and are again underpinned by physiological processes which may one day be capable of explanation at such a level.

It is perhaps by now apparent that the approach taken in this book is largely empirical, in so far as it concerns itself for the most part with various kinds of observation and evidence; and also physical, in so far as it assumes that musical behaviour of all sorts is explicable without resort to abstract or metaphysical entities. It is not claimed that there is any absolute virtue in such an approach, but simply that it has pragmatic value, and also that it makes a change from some other more mystical interpretations. The claim to pragmatism stems from the belief that a more satisfactory, deeper, and ultimately more sensitive understanding of musicality and musical experience will emerge from a standpoint of parsimony and humility than from one which starts with an initial series of value-laden assumptions about the subject matter. The dangers of the latter approach have been exposed admirably by Arthur Koestler in his book *The Act of Creation*. Speaking of the aesthetic snob, he writes, 'When he reads Kierkegaard he is not moved by what he reads, he is moved by himself reading Kierkegaard.' In an analogous way, there are perhaps individuals who are not directly moved by music, but who are very moved by the taste and sophistication they show in going to a symphony concert. The same is also true for jazz music, where a distinction is sometimes made between 'real punters' and 'scene-diggers'.

At the same time, it must be conceded that there are limitations and dangers inherent in the approach adopted. In later chapters, several instances will be cited in which the very application of a rigorous experimental method has caused the phenomenon under investigation to disappear like mist before the rising sun.

Examples of this include investigations into the nature of consonance and dissonance which remove context and use only isolated chords, thereby casting light only on a particular laboratory situation, and saying little about music. Or the erroneous application of information theory, in which a sequence of tones picked at random from a particular major scale is assumed to be a musically random sequence. Such shortcomings, however, are often of value in themselves since they demonstrate what music is *not*. The harmoniousness of a consonant chord and the unpleasantness of a dissonance, for example, are not invariant relationships, but vary depending on the musical context and the musical culture in question. This has only become apparent through the performance of context-free studies, leading to the realization that the experimental situation did not reflect the musical experience.

One consequence of the scientific study of music has been the undermining of beliefs about the basis of Western musical theory, and the growing realization that other music forms which violate these principles are not necessarily inferior. The supposed superiority of music in the Western classical tradition over other forms is apparent in the writings of many authors, who make the distinction between Western music and primitive music, as though the latter were at some lower and inferior level of development; thus any development must automatically be towards the true light of Western music. This tendency is not unique to the field of music, however. Because of the rigidity, and frequently the absurdity, of our criteria (which are arbitrary), it is almost habitual to think of New York as a civilized part of the world, whereas the 'savage' society of the African pygmy would be described as uncivilized. There are very good reasons for arguing precisely the opposite. It has been assumed in the past that musical theory, as we know it, has a firm physical basis, and that consequently laws of harmony, counterpoint, fugue and so on are 'real' in the sense that they are underlaid by physical laws. Such a notion, if true, would provide support for musical theory, since an example of bad harmony or incorrect counterpoint would be not just a departure from an arbitrary rule, but would run counter to nature. Unfortunately, the assumption of a straightforward physical basis is not justified. There are very few musical universals, and the story of the development and evolution of music is better expressed in terms of the progressive and systematic violation of rules than in terms of adherence to them. 'It seems that the voluminous edifice of musical theory rests on sand', wrote Moles (1968).

A good example of the discrepancy between theory and practice is given by Pederson (1975). This author performed fascinating research into twelve-tone composition, the theory of which involves the supposition that 'the notes of a series can be used in any octave position. As long as the succession of notes is unchanged, each note can be played in any register' (Brindle 1966). The above theory is based on the notion of 'octave equivalence', and claims that particular notes of the scale are equivalent regardless of the octave in which they fall. In a series of experiments involving random transposition of octaves, Pederson

concluded that, although it was possible to learn the notes of a twelve-tone series, 'random octave transposition of the members of a series of twelve different pitch classes destroys the perceptibility of the series'. The author states, with great perceptiveness, 'The controversies that have arisen over serialism have probably resulted from critic and composer alike often failing to distinguish between compositional working techniques and perceptible musical structure. The composer cannot assume that because a technique is logically consistent it will necessarily result in perceptible sound structures.' In other words, the working method adopted by the composer in such a case is a purely arbitrary law, and the fact that his composition obeys the self-imposed rules is no guarantee at all that the composition will have any perceptual unity. This example is, of course, fairly extreme.

To say that musical theory is based on a set of largely invented rules rather than on a set of natural laws is not to diminish it, however. The rules define the area within which the artistic endeavour takes place. They make possible such things as aesthetic deviation, confirmation or disconfirmation of expectancy, and the deliberate violation of rules for aesthetic effect, all of which are critical events as far as musical cognition is concerned. The game of cricket, for example, is in the same way precisely defined by its rules, and without the rules the game cannot take place. In the absence of rules there is a state of utter liberty in which pure chance reigns, and a chain of purely chance events is without meaning. In summary, there can be no art without some kind of constraint.

In large part, the psychological study of music involves examination of the relationships between the rules of music and the laws of perception and cognition, in so far as these latter are understood. The area of study thus defined is surprisingly large, and includes areas of research which have practical, as well as theoretical, implications. Thus, in addition to the traditional areas of research into the perception of tones, the nature of musical ability and its assessment, and emotionality and music, there is an expanding literature on the uses of music in industry, music as therapy with handicapped groups, and the application of certain principles to the teaching of musical skills.

The role of music in the service of industry ranges all the way from the use of piped music in supermarkets (a practice which does not meet with universal approval), through to more precise studies of the effects of different types of music upon work rates. The use of music in industry to induce people working at mundane jobs to work harder, or to make the time pass more easily, is not an entirely happy alliance, and involves some ethical problems. None the less, the finding of a relationship between music and task performance is in itself of interest. Music in industry seems to have enjoyed a heyday in the years 1940 to about 1944, particularly in the USA. At that time, a number of forays were made into this area, many of which are difficult to interpret in the light of the confounding variable of a world war. For example, Hough (1943) claimed not merely an increase in production, but also a 35 per cent reduction in accidents after the introduction of industrial music. Halpin (1943-4) showed, or rather

claimed, major improvements in morale due to music. However, a study in the same year by Kerr showed that people liked patriotic songs as much as dance music, a state of affairs almost certainly related to the world situation, and very different from today's apparent preference for pop music. Increasing production, safety, and morale appear to be things more easily achieved during war than in peace-time.

There are reasons for supposing that some of the claims made by less rigorous investigators, or people with a commercial interest, are often overly optimistic. More careful studies reveal less striking, or non-existent, improvements. A detailed study by Kerr (1945) investigated effects of music upon performance of repetitive tasks in an electrical factory. Using a counterbalanced design, involving periods of music and no-music, Kerr found slight improvements in production and slight reduction in scrappage. In groups of employees containing more than twenty-five individuals, production was increased by only 1·86 per cent and scrappage reduced by 3·53 per cent. Moreover, these differences were not statistically significant (they fall within the range of chance), though, in a subsequent note, Kerr claims that his statistical analysis was 'overly conservative'. Research by McGehee and Gardner (1949) investigated the effects of music on what they describe as a 'complex industrial job' to contrast with earlier studies where the task was often repetitive and uncomplicated. The job involved the setting up of looms for rug-making. In this instance, the authors concluded that the music had no effect, favourable or otherwise, upon production. If individuals were favourably affected, then such favourable effects must have been masked by unfavourable effects on other workers.

In 1947 Cardinell and Burris-Meyer were moved to comment on the 'music in industry' boom, and pinpointed four misconceptions. These were:

1 The basic concept: music in industry is defined as a good thing. That is all there is to it.
2 The benefits: it works like a slot machine. You put in the music and out comes your production increase.
3 The sop to labour: feed the people the auditory equivalent of candy and they will be grateful to you.
4 Programmes: give them what they ask for; after all, the purpose is to keep them happy.

An excellent paper by Uhrbrock (1961) gives a broad coverage of what has been achieved in this area. It is apparent that some claims are simply unsubstantiated. Some studies claim success on the basis of irrelevant criteria. For example, production increases have been demonstrated by such methods as playing music to employees, then asking them whether they like it (it appears that a majority say 'Yes'), and finally asking them whether they *think* they produce more when the music is playing. In another study, a work team in an aircraft factory happily agreed to an eighteen-hour overtime shift, during which a good production rate was maintained. The result was attributed to music, which it was claimed, sustained the workers. However, the researcher also reports that they

received coffee and sandwiches during the shift. Studies like these have little scientific value, but appear in large part to be responsible for the 'music in industry' myth. Uhrbrock also has some amusing things to say about the claims of Muzak (1958), a firm which supplies music to many commercial undertakings. An up-to-date opinion cannot be given, however, as it has proved difficult to obtain information from the firm.

It is clear that a free-for-all approach is unlikely to have the required effects. For example, the author quite recently received an enquiry on behalf of a large catering organization, who had encountered a problem after they had given a group of working girls a choice of music. The girls had apparently requested Radio 1, and subsequently output had gone down since the girls preferred to listen more and work less. The employers reacted with some dismay as DJs instructed their audience to 'stop whatever you're doing, put your feet up, and relax for five minutes', and so forth. The dilemma remained unresolved. Finally, in some industrial settings, high levels of background noise interact with the background music which itself has to be, consequently, very loud. Even so it is often only heard indistinctly or intermittently. Though noise has been much studied, this type of interaction has not.

Recent, precise, studies have been performed in that bastion of industrialization, Japan, where the role of music in industry is taken quite seriously (Yoshida 1965).

The use of music as therapy, especially with handicapped children, is an application which would probably meet with more universal approval. Since the founding of the National Association for Music Therapy in the USA in 1959, this subject has made large steps forward, both with respect to the assessment of its own effectiveness, and in scientific rigour. None the less, there is still a tendency for much of the work, and the evaluation of effectiveness, to take place at an intuitive level (though this does not necessarily mean that the work is thereby rendered of no value. It might be of great benefit, and certainly appears to be so in many cases). A recent book by Nordoff and Robbins (1973) illustrates with great sensitivity some of the results of music therapy with handicapped children, and contains some very powerful photographs. However, the work is totally descriptive, so that it is impossible to specify why the therapy appears to work in some cases but not in others, or whether the effects are specifically musical or could be achieved by any type of therapy involving prolonged close contact with a sensitive adult. Finally, the statements that the therapy produces increased awareness, increased responsibility, or greater social ability, for example, are based on subjective impressions. On these kind of issues, Madsen and Madsen (1970) write, 'To state that patients singing side by side are "socialising" is somewhat misleading; . . . and to assume that this "socialising" is monolithically good appears extremely questionable', and later, speaking of the rationale for employing this type of therapy, they write perhaps a little facetiously, 'To place a patient in the hospital chorus for specific reasons pertaining to his particular malady appears wise. If the reason the patient was

institutionalised was in part that he could not sing songs side by side with other people, then the speculative positive benefits from this experience seem advisable.' Despite these comments, there can be no doubt that music therapy has been of great benefit in many cases, even if the benefit sometimes appears diffuse rather than specific. This is a fascinating and expanding area. There are recent reports of its use in the USSR (Brusilovsky 1972). Brusilovsky recommends a 'differentiated' approach, which he finds to be an 'effective means of overcoming autism in schizophrenic patients and of eliminating their inertness and their negative attitude toward work'. The 'differentiated' approach involves devising a programme for a patient which becomes gradually more complicated and demands progressively more active participation. Tasks used involve, for example, passive listening, active listening, choir singing, individual singing, ensemble work, and playing the piano. Again, however, the results are in the form of subjective report.

On the whole, the teaching of musical skills, especially in this country, tends to follow traditional lines; psychology does not appear to have penetrated very far into these realms, perhaps because it has achieved relatively little. Interesting issues have been raised, but with the exception of test construction (a topic covered in some detail in later chapters) none of them seem to have gathered much momentum. For example, various forms of feedback have been shown to be effective in improving pitch discrimination. These methods involve presenting the subject with information about the accuracy of his judgements in various types of pitch matching or discrimination tasks, leading to subsequent improvements in performance. Perhaps the most sophisticated example of this kind is the voice tonoscope, a device which presents a singer with a pictorial representation of the notes he is singing, on a television-type screen (Seashore 1906). Any inconsistencies are reproduced visually on the screen. In the field of assessment, Lamp and Keys (1935) examined the feasibility of predicting aptitude for playing *specific* musical instruments, a fascinating idea, but again one which has received little subsequent study or application. Perhaps the most famous (or infamous) example of the application of particular teaching/learning methods to the teaching of musical skills comes from the work of Shinichi Suzuki in Japan. Under his intensive methods, very small children acquire instrumental techniques vastly in excess of what one would expect for their age group, though some critics have suggested that the final results sound a little mechanical. Suzuki has produced literally thousands of tiny, competent violinists during recent years, a fact which one might view with some alarm in view of the somewhat astringent nature of early violin-playing endeavours. The methods used are highly concentrated and intensive, and run to the extent of small children having tape-recorders strapped to their backs (or, as a musician friend described it, of small children being strapped to the front of tape-recorders) so that they can hear the tunes they are to learn, constantly, at almost any time of night or day. Although Suzuki's results are in many ways outstanding, the approach is perhaps a little too regimented for some tastes. None the less, Suzuki's basic

tenet, that a person's environment governs his artistic skill and sense, makes a change from some of the more traditional, and exclusive, views of musicality as a purely hereditary trait. There have been many and varied studies of musicality as a hereditary trait, ranging from Shuter's scientific investigation to more ambiguous evidence from family-trees of famous families like the Bach family. This topic will be mentioned in a later chapter, but, suffice to say, the problem remains one of separating environmental from genetic factors. If one is musical, and one's father and mother are musical, this could be because one has inherited the musicality from one's parents, or because one was made to practise five hours a day since the age of zero; or both sets of factors could contribute. Whatever the truth of the matter, the Suzuki war-cry, that everywhere talent is common, but favourable environment is not, is a most optimistic one.

On the topic of music in education, it is worth while noting that some music educationists have aims and ideals which go far beyond the mere teaching of musical skills. Music lessons are seen not just as music lessons, but as education for living generally. For example, in an essay on 'The place of music in education', Nickson (1967) writes, 'Music affects every pupil and contributes more than any other single experience to the well-being of the growing child', and also, 'Without the presence of music a school lacks a soul. Here is the early training ground of character and personality.' There are other examples of such idealism. Suzuki is reported as saying, 'Music has an invisible but mighty living power to save mankind', and urges that music policy should be a primary national concern. Zoltán Kodály, who has worked with and written extensively for children, says, 'We must look forward to the time when all people in all lands are brought together through singing, and when there is a universal harmony.' The belief seems to be that musical education has effects upon character and personality that generalize to other situations, and affect almost all other aspects of life in a favourable way. Such traits as self-discipline and social awareness are also taught, it is claimed, by a proper musical education. Unfortunately, there is very little to support such claims, and for the most part they remain matters of idealistic belief. Whilst there is no doubt that many music educators hold such beliefs very deeply and sincerely, it is also unfortunately the case that they are the kinds of platitudes which, in the mouths of others, win loud applause at music conferences. It is important to take a less passionate view of music, if objectivity is to be preserved. For example, some children actually *dislike* music, and music lessons may consequently be a source of very great anxiety for them. We may in fact be tormenting some children by forcing music lessons on them. Also, the bringing of nations together in song seems to occur at least as much in times of war as in times of peace; and nearer home, mass singing is a frequent accompaniment to some of the worst conflicts between rival football supporters. In other words, song can not only unite people together, it can apparently help in uniting them *against* someone else. Finally, the notion that musical harmony leads, as Kodály suggests, inevitably to social harmony, is simply not true. It is not difficult to find petty jealousies,

or even more positive dislikes, between members of the same symphony orchestra. In summary, one can say that in so far as such beliefs lend fire and determination to music educators, they are wholly admirable. However, to make such claims into the overt and explicit aims of music education is to make the subject appear ridiculous to those not intimately involved. Why such claims should be made for music, rather than botany, geography, painting or ceramics is not clear. In short, regardless of what we believe, we must distinguish between belief and fact, and not publicly lay claim to the unsubstantiated or the fantastic.

The three areas outlined in the above paragraphs, namely music in industry, music therapy, and music education, are from many points of view important, especially as they are three areas in which knowledge about the psychology of music can actually be applied. This book, however, is concerned almost wholly with music from the standpoint of the listener, rather than with practical applications in these three applied areas, and no further mention will be made of them. This limiting of the coverage to the main theoretical, experiential and sensory aspects of music is made without intending to imply that other areas are unimportant. It is simply that another book would be necessary to cover the uses to which music might be put. The immediate concern here is with music and musicality *per se*, and with the evidence and the theories which have been put forward to support various notions about musicality, and to explain some of the phenomena which occur when people listen to music. With this purpose in mind, the next chapter concerns itself with a highly simplified introduction to the physics of musical sound, as an introduction to some of the more equivocal topics.

What is music?

Music is something of a mystery. Most people spend considerable amounts of time listening to music of one sort or another, and some people dedicate the major part of their lives to musical pursuits. Yet, unlike other activities such as reading, talking, or watching television, where the transmission of a more or less unambiguous message is readily apparent, music does not appear to pass on any message we can readily identify. Music does not really satisfy the requirements that would completely justify its being called a 'language', since we tend to use the word 'meaning' rather differently in the context of music than in the context of language. In addition, music seems to have something in common with simple forms of sensory experience like warmth, taste, or the smell of jacket-baked potatoes. For example, one can, in a sense, appreciate the taste of a good steak, although the question 'What does it *mean*?' is hard to answer. By the same token one can ask 'What does Beethoven's "Fifth symphony" *mean*?' and again be at a loss for a satisfactory reply. Any answer we might attempt would be couched in terms of our own reactions and feelings, and these are not identical with another person's responses to the same piece of music. By contrast, the message 'The cat sat on the mat' is fairly precise in its meaning, and relatively unambiguous. However, it is not the kind of message that most of us would become excited about.

Despite these elusive qualities, people in all parts of the world indulge in musical pursuits with great enthusiasm, and their lives are often profoundly affected as a result. Individuals can be stirred to great and glorious sentiments by the sound of a martial strain, moved to compassion by the sound of a lullaby, or driven to sorrow and despair by a symphony, or merriment and laughter when a jolly tune is struck up. Emotional responses apart, people's actual behaviour can be affected by music. Productivity in factories can be influenced by the music we play to the workers, the well-being of mental patients can be affected by the playing of suitable music, and warriors seem to forget their fear and rush into battle on hearing the sound of the bagpipes or the war drums. At a more fanciful level, it has even been claimed that cows give more milk, and that hothouse plants grow more rapidly, when we accommodate to their musical tastes.

The widespread influence which music undoubtedly has, has led some authors to describe it as a system for communication of emotions. Certainly, our responses to music are emotional. And yet can we describe as 'communication' something which produces dissimilar effects in different people, produces no effects