An assessment of the validity of Bernstein’s linguistics in the ‘Unanswered Question’ (1973) and the boundaries of his ‘quasi-scientific’ approach

Abstract

In his Norton Lectures (1973), Bernstein presents a self-styled ‘quasi-scientific’ exposition on an intuitively felt and – purportedly – rationally established ‘musico-linguistics’. By asserting the significance of the harmonic scale as a foundation for an innate musical competence, Bernstein creates a theory of musical grammar ostensibly akin to the transformational generative grammar expounded by Chomsky (see e.g. Language and Mind 1968); and, in so doing, appears to validate an underlying theory of musical universality, by which all musical ideas, owing to their shared ‘substantive universal’ phonemic subunits, may be similarly perceived by all listeners. This Critical Project will assess the methodological viability and aesthetic fruitfulness of the asserted search for valid analogies between music and linguistic analysis. In order to do this, the generative linguistics of Chomsky, as an attack on the inadequacies of structural linguistics, will first be considered; then Bernstein’s claims to and supposed evidence for a successful application of Chomsky’s analytic apparatus to the perception of music will be assessed; next, a critique of Bernstein’s approach by Keiler (1978) will be put forward, with due attention paid to further criticism of Keiler’s work by Jackendoff and Lerdahl, and to Keiler’s own response in his defence; and finally a re-evaluation in support of Bernstein’s intuitions, in spite of
their methodological inaccuracies and inherently problematic application, will be proffered. First, however, an exposition into Chomsky’s linguistics, and the perceived inadequacies in existing theories of structural linguistics which provided its impetus, must be considered.

**Structural linguistics and the Chomskian attack**

The foundations of structuralism as a theory – if it can be considered in terms of such homogeneity – were first laid in the early 20th century and were premised on the notion that the world did not consist of independently existing and individually recognisable objects; rather, that objective perception, owing to human subjectivity, was impossible, and therefore that primacy ought to be placed on the relationships constructed between the observer and the observed as the only social phenomenon that could be truly accounted for; and the only realm in which the nature of these objects might be veritably viewed.¹ The structuralist aim can be considered as ‘an explicit search for the permanent structures of the mind itself, the organisational categories and forms through which the mind is able to experience the world, or to organise a meaning in what is essentially in itself meaningless.’²

The development of a structural linguistics gained momentum some half a century later, following the posthumous publishing of Ferdinand de Saussure’s *Cours de Linguistique Générale* (1916).³ Saussure conceived of two concurrent linguistic systems, which he dubbed ‘parole’ – everyday utterances – and ‘langue’ – the abstract

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language system through which those utterances are constructed.\textsuperscript{4} Since the phonetic sounds comprising these systems do not carry their own independent and observable significance, as per the structuralist view, they were, for Saussure, arbitrary in nature, and organised according to their differences in what he termed ‘binary oppositions’.\textsuperscript{5} Thus, meaning resided not in the phonetic constitution of words, but rather in the distinction in their auditory perception;\textsuperscript{6} and it was in the recognition of these binary oppositions that a child engaged in his first ‘intervention of culture into nature.’\textsuperscript{7} Language, therefore, existed as a ‘system of signs that expresses ideas’\textsuperscript{8} whose meanings lay in that arbitrary phonetic relationship between the concept being signified (‘signifié’) and its respective sound image or signifier (‘signifiant’).\textsuperscript{9} The application of these concepts was widespread, and contributed to the evolution of manifold fields, as evinced by the anthropological studies of Claude Lévi-Strauss,\textsuperscript{10} the semiotic hypotheses of Roman Jakobson\textsuperscript{11} and the literary analyses of Roland Barthes,\textsuperscript{12} among many others, the full scope of which this Critical Project may acknowledge, although not elaborate.

Building upon these foundations, the structural linguistics of American academia ‘[became] a classificatory science.’\textsuperscript{13} Structural linguists sought to classify all elements of human language through the collection of ‘corpora’ of ‘data’ which would be subjected to hierarchical categorisation and ultimately through which

\textsuperscript{4} T. Hawkes, \textit{op. cit.}, 20
\textsuperscript{5} \textit{ibid.}, 22
\textsuperscript{6} \textit{loc. cit.}
\textsuperscript{7} R. Jakobson & M. Halle, \textit{Fundamentals of Language} (The Hague, 1956), 60-61
\textsuperscript{8} F. de Saussure, \textit{op. cit.}, 16
\textsuperscript{9} T. Hawkes, \textit{op. cit.}, 25
\textsuperscript{10} See e.g. \textit{Anthropologie Structurale} (Paris, 1958), \textit{Mythologies I-IV} (Paris, 1964-1971) etc.
\textsuperscript{11} See e.g. \textit{Selected Writings} (The Hague, 1971-1985), \textit{The Framework of Language} (Michigan, 1980) etc.
\textsuperscript{12} See e.g. \textit{Le Degré Zéro de l’Écriture} (Seuil, 1953), \textit{Le Plaisir Du Texte} (Seuil, 1975) etc.
\textsuperscript{13} C. Hockett, ‘A system of descriptive phonology’, \textit{Language}, 18 (1942), 3
rigorous ‘discovery procedures’ for extracting ‘substantive universal’ subunits from the ‘corpora’ would be established.\textsuperscript{14} This fell in line with a behaviourist approach to sociological research, by which observable social facts were considered the only acceptable data for consideration, and formed part of a wider methodological debate against those anti-empiricists who deemed such facts as only partially indicative of the fundamental and hidden underlying laws of behaviour.\textsuperscript{15} In contrast with the European vein, semantic meanings came to be considered largely irrelevant, since they were deemed to relate to patterns of behaviour, supposedly determined by a stimulus-response mechanism – i.e. falling in the realm of psychology – or to involve non-linguistic knowledge, and therefore beyond the interests of the linguist – and thus primary emphasis was laid upon syntax.\textsuperscript{16}

This structuralist agenda, however, presented several fundamental methodological problems which were noted by Noam Chomsky, among others. Chomsky observed that structural linguistics could not account for certain internal relationships between seemingly similar sentences. For example, the sentences ‘John is easy to please’ and ‘John is eager to please’ might appear alike – certainly both seem to share the same noun-copula-adjective-infinitive verb structure\textsuperscript{17} – but the difference in semantic meaning is patently clear to any English speaker. Similarly, the structuralist approach could not account for sentences containing unambiguous words positioned in a syntactically ambiguous manner, thus producing multiple meanings, such as ‘flying planes can be dangerous.’\textsuperscript{18} Furthermore, the approach could not adequately describe

\textsuperscript{http://www.chomsky.info/onchomsky/19720629.htm}
\textsuperscript{15} ibid.
\textsuperscript{16} ibid.
\textsuperscript{17} ibid.
\textsuperscript{18} N. V. Smith, \textit{Chomsky: Ideas and Ideals} (Cambridge, 2004), 54
underlying similarities between superficially distinct sentences, as in the case of ‘the girl will play the game’ and ‘the game will be played by the girl.’ Perhaps most crucially, the infiniteness of potential sentences presented structural linguists with an impossible classificatory task.

These inadequacies prompted Chomsky’s reassessment of the state of linguistics. He proffered an alternative generative theory based on the identification and structural description of grammatically correct sentences from the myriad possibilities in any natural language, as distinct from grammatically incorrect strings of words.\(^{19}\) This represented a shift of focus from the aforementioned ‘corpora’ to the ‘linguistic competence’ of the speaker which he or she used to construct new sentences in accordance with the grammatical rules of the spoken language.\(^{20}\) Chomsky’s notion of ‘competence’ was that of an innate, universal, and specifically human mental mechanism for comprehending and employing grammar, which appeared to account for the quick and creative manner in which children were observed to divine previously unheard but syntactically accurate sentences, as if born ‘with a perfect knowledge of universal grammar, that is, with a fixed schematism that [they use]…. in acquiring language.’\(^{21}\) Chomsky distinguished between linguistic competence and its use in everyday utterances which he termed ‘linguistic performance’, paralleling the Saussurian langue/parole dichotomy.\(^{22}\) For Chomsky, all sentences contained a deep structure of underlying strings of linguistic material which underwent grammatical transformations in order to produce ‘the final stage in the syntactic representation of a

\(^{19}\) See e.g. N. Chomsky, *Syntactic Structures* (London, 1957), *Aspects of the Theory of Syntax* (Massachusetts, 1965)  
\(^{20}\) J. R. Searle, *op. cit.*  
\(^{22}\) T. Hawkes, *op. cit.*, 22
sentence… [providing] the input to the phonological component of the grammar,\textsuperscript{23} or the sentence’s spoken surface structure – and hence the term ‘generative transformational linguistics’.

Chomsky’s linguistics provided the impetus for Leonard Bernstein’s restatement of his undergraduate intuitions regarding the relationship between music and language in his Norton Lectures of 1973.\textsuperscript{24} For Bernstein, much like the notion of language proffered by Chomsky, music was a vitally innate, universal, and human function; the new transformational grammar appeared to Bernstein as a viable analytic apparatus waiting to be applied to the perception of music. In the following section, Bernstein’s interpretation and application of Chomsky’s grammar as supporting evidence for such a view of music will be considered.

**The Norton Lectures and the Bernsteinian interpretation**

The Norton Lectures were delivered at Harvard University during October-November 1973. In the first three lectures, Bernstein sets forth his perceived relationship between the ‘new linguistics’, and his intuitive conception of music as a language. These he titled ‘Phonology’, ‘Syntax’ and ‘Semantics’, each dealing with a distinct but intrinsically linked branch of linguistic study: the first, of the system of relationships between the speech sounds constituting a given language; the second, of the structures arising from those sounds; and the last, of the ‘natural result of adding phonology and syntax together… meaning.’\textsuperscript{25} The final three lectures focus on the

\textsuperscript{24} L. Bernstein, *The Unanswered Question* (Massachusetts, 1973)
\textsuperscript{25} L. Bernstein, *op. cit.*, 9, author’s emphasis
Implications of the above for the future of Western music, addressing the question inspired by Ives’s ‘the Unanswered Question’ (1908): ‘Whither Music?’ Since it is in the first three that the bulk of linguistic extrapolation takes place, it is here that attention will be centred. It should be noted that Bernstein uses the expression ‘Chomskian’ as a ‘term of convenience’; and while he reveals awareness of the significance of other linguists in the rise of generative grammar, his recognition of Chomsky as revolutionary in this field is unquestionably sound.

It is important at this point to credit the innovative nature of Bernstein’s work. His direct application of linguistic theory to music analysis naturally served to engage his Harvard audience, especially given the contemporaneous youth of generative transformational linguistics and the fresh enthusiasm surrounding its propagation. More significantly, the televised broadcasts of the Lectures and the accessible manner of their delivery not only brought this material to the attention of a lay-audience otherwise unoccupied by such concepts, but also generated excitement around the myriad potential perceptions and experiences of classical music. The value of an assessment of Bernstein’s theory of ‘musico-linguistics’ is inherent in the latter reasons in particular, and it is due to their widespread impact and applicability to other fields of thought that the validity of Bernstein’s analogy between generative transformational linguistics and musical analysis ought to be re-evaluated.

Lecture 1 – Phonology

26 L. Bernstein, op. cit., 8
Bernstein begins by setting out the initial premise underlying his intuitions regarding ‘a worldwide, inborn musical grammar…’, spurred by the self-reported discovery of a musical germ originating in Copland’s piano variations (1937) in a plethora of seemingly unrelated musical works, including the gamelan sléndro scale. He acknowledged this notion as ‘ill-defined, and apparently nonverifiable,’ which could only be systematically approached with the support of parallel evidence in linguistic research. Since music is constituted of mathematically measurable elements (frequencies, decibels etc.), Bernstein suggests that it may be approached scientifically, like the new Chomskian grammar; and from this arises the question ‘why not a musico-linguistics, just as there already exists a psycho-linguistics and a socio-linguistics?’. By creating a musical analytic framework analogous to that propounded Chomsky for language structure, a holistic model for understanding ‘how we communicate in a larger sense: through music, through the arts in general, and ultimately through all our social behaviour’ might be constructed.

In keeping with transformational generative methodology, it would be necessary to seek ‘substantive universals’ within the musical text, beginning on a phonological level. In contrast with linguistic substantive universals, which are largely arbitrary and premised upon the physiology of individuals’ throats and oral cavities, musical substantive universals are, for Bernstein, to be found in the naturally occurring, pre-ordained, harmonic scale, and it is upon the prevalence and potency of this phenomenon that his case for musical universality and innateness is premised. By rearranging the harmonic overtones created by increasingly small subdivisions of

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27 L. Bernstein, *op. cit.*, 5
28 L. Bernstein, *op. cit.*, 7
29 L. Bernstein, *op. cit.*, 9
30 L. Bernstein, *op. cit.*, 8
31 L. Bernstein, *op. cit.*, 9
vibrating pitch-producing sources into scalar order, Bernstein sought to reveal the particular intervalllic relationships underpinning Western tonal tradition, which, when permutated, might be identified cross-culturally.32

Following from this, a case for musical monogenesis akin to the linguistic monogenetic argument might be made, by which all musical ‘grammars’ – understood here to mean culturally distinct musical styles – might have originated from the same source.33 By prolongating the ictus of the first hypothesised hominid ‘proto-syllable’ – imagined by Bernstein to be ‘MA’ – or, linguistically, by recreating the proto-morpheme as a pitch-event, the first musical sound was born. Given the globally recognised maternal connotations of the sound, one might be convinced to follow Bernstein’s intuitions.34

The relevance of these musings to the perception of classical music lies for Bernstein in the concept of ambiguity, the essence of which is to be found in the tension between chromaticism, born of the rearrangement of the harmonic series into its consequent circle of fifths and its opposing diatonicism, founded on the stable relationship of tonics and dominants.35 The development of equal temperament in the seventeenth century enabled free modulation throughout a musical work while maintaining tonal control and avoiding dissonant intonation, and it is this vitality of concurrent freedom and structure that represents for Bernstein ‘one of art’s most potent aesthetic functions.’36 That this function appears to Bernstein to be constituted of the naturally occurring harmonic series reinforces the notion of a Chomskian

32 L. Bernstein, op. cit., passim
33 See e.g. A. Trombetti, L’unità d’origine del linguaggio (Bologna, 1905)
34 L. Bernstein, op. cit., 13
35 L. Bernstein, op. cit., 37
36 L. Bernstein, op. cit., 39
inbuilt musical competence, ‘our inbuilt capacity to construe those naturally serialised overtones, and to construe them in different ways’;\textsuperscript{37} and, indeed, when the Western tonal tradition seemed to attack the boundaries of this natural capacity with the rising prevalence of twelve-tone composition – or, in Bernsteinian terms, ambiguity was pushed to a point of excess – musical clarity was threatened, and hence the urgency of the question ‘Whither Music?’, tackled in the final three lectures.

\textit{Lecture 2 – Syntax}

Having identified the harmonic series as the primary ‘substantive universal’ for analysis, Bernstein sought to construct parallel musical analogies imported from transformational generative linguistic methodology. In so doing, Bernstein claimed, it might be possible to ‘[speak] about music with intelligent but nonprofessional music lovers... since language is something everyone shares.’\textsuperscript{38} Significantly, the emphasis here, as is the case for much of Chomsky’s work, falls upon syntax, the ‘study of the actual structures by which [those] sonic universals have evolved into words, and words into sentences.’\textsuperscript{39}

Rather than using a parsing method, as per school grammar exercises, which yields fruitful but narrow results, Bernstein calls for the application of transformational processes to the original musical material – scale, meter, tempo etc. – present in the deep structure of a musical work. This material, following the linguistic analogy, was conceived by Bernstein as arranged in a pattern of underlying strings, and it was the transformation of these strings which produced the musical surface structure audibly

\begin{itemize}
\item \textsuperscript{37} L. Bernstein, \textit{op. cit.}, 30-31
\item \textsuperscript{38} L. Bernstein, \textit{op. cit.}, 53
\item \textsuperscript{39} L. Bernstein, \textit{loc. cit.}
\end{itemize}
perceived by the listener. For Bernstein, there exists a fundamental distinction between language and music: while language in its simplest form exists as purely communicative prose, music only exists as purely aesthetic poetry – that is, there is for Bernstein no ‘musical prose’. Thus, whilst grammatical transformations serve to elevate linguistic prose to a poetic surface structure level, the application of these transformations to musical material produces a poetic ‘super-surface structure’, and it is this discrepancy which represents for Bernstein the ‘metaphorical leap’ at the heart of human creativity.  

He supplements this by expanding the invalid equation note = morpheme, to reveal the following results:

1. note = phoneme
2. motive = morpheme
3. phrase of music = word
4. musical section = clause
5. movement = sentence
6. piece = piece

Referring to a passage in Mozart’s g minor symphony, Bernstein goes on to show the inadequacy of point 3., as it requires the dovetailing of certain notes, akin to the single pronunciation of the doubly employed ‘d’ in the adjacent words ‘dead’ and ‘duck’, producing the non-sequitur ‘deaduck’. Thus he concludes that the best equivalence is note = word, although he finds the analogy ‘scientifically shaky’.

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40 L. Bernstein, *op. cit.*, 84
41 L. Bernstein, *op. cit.*, 58, Fig. 7
42 L. Bernstein, *op. cit.*, 59
43 L. Bernstein, *op. cit.*, 72
To demonstrate the applicability of Chomskian transformations to musical deep structures, Bernstein seeks to create the musical equivalent of a spoken phrase by adjectivally modify a chord – taken as a musical ‘noun’; in this instance, the Wagnerian ‘Fate’ motto, which he views as a self-naming entity, independent of its ascribed meaning\(^44\) – by altering its harmonic colouration, and then incorporating a \(\frac{3}{4}\) time signature as a rhythmical activator or ‘verb conjugator’, the result of which he dubs ‘Cruel Fate Waltzes.’\(^45\) A further example involves the Chomskian ‘Jack loves Jill’ paradigm, equated here with a deep-structure underlying string consisting of an E flat major triad, to which Bernstein applies transformational rules such as deletion – the elimination of a contextually superfluous repetition of a part of speech in a syntactically correct sentence – to produce a given number of surface structures.\(^46\) The crux of Bernstein’s findings is expounded in his examination of the aforementioned Mozart symphony: that a studious and careful application of these grammatical rules in an analysis of a work can enlighten the performer or listener about the musical intentions of the composer, and thus facilitate the most faithful interpretation and auditory experience of his or her piece.\(^47\)

It must be noted that Bernstein concedes early on that the analogies he seeks are ‘quasi-scientific’: ‘… I should…’ he notes, ‘be committed to ‘scientific method’… I am restricted to hypothesising and speculation.’\(^48\) While the betrayal of awareness of his incapacity to adequately substantiate his claims might endear his audience to his cause, such a statement does not release Bernstein from the level of methodological

\(^{44}\) L. Bernstein, op. cit., 63
\(^{45}\) L. Bernstein, loc. cit.
\(^{46}\) L. Bernstein, op. cit., 73
\(^{47}\) L. Bernstein, loc. cit.
\(^{48}\) L. Bernstein, op. cit., 57
accuracy that is expected of such an overarching thesis. The apparent conflation of what is intuitively sound and what is logically acceptable remains unresolved.

Lecture 3 – Semantics

Here Bernstein delivers the core of his linguistic exposition, the proposal of a thesis of musical metaphors. For Bernstein, all of the aforementioned transformational processes facilitate the puns and anagrams upon which ‘all music, even the most serious, thrives.’ Since music for Bernstein does not exist as communicative prose but only as aesthetic poetics, these processes must all produce results that lie in the realm of the aesthetic, i.e. when applied to music, they must always produce metaphors. This however is not necessarily the case when applied to linguistic material, which exists both as poetry and as prose; and therefore music, in contrast to spoken language, he claims, may be considered entirely metaphorical.

The foundation of these metaphors lies for Bernstein in the resolution of semantic ambiguity. While the cognitive process occurring in a linguistic context involves time for the categorisation of the text as metaphorical, and hence poetic rather than literal, such a delay does not exist for Bernstein in a musical context, as ‘music already exists in the poetic sense.’ The structure of the musical metaphor, like its linguistic equivalent, involves an equation of two incompatible orders breaking from the accepted semantic rules, in which both orders relate to a third common element or ‘X-factor’ such as harmony or rhythm, which is rendered implicit by transformational

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49 L. Bernstein, op. cit., 140
50 L. Bernstein, op. cit., 129
51 L. Bernstein, op. cit., 139
52 L. Bernstein, op. cit., 122
processes. There exist three types of metaphor for Bernstein: intrinsic, represented by the synonym ‘this-is-that’; extrinsic, in which musical meanings relate to non-musical meanings; and analo
gical, in which musical transformations are compared to their verbal counterparts. Bernstein claims that these metaphors may not only be demonstrated but proven scientifically, although he warns that the term itself implies a degree of removal from the concretely scientific, and indeed that its very use here is metaphorical.

The meaning of music, he explicates, is created by the ongoing regeneration and interrelation of the metaphors produced by poetic transformations, and as a result is entirely intrinsic, and not to be conflated with specific feelings, or extra-musical entities. Unlike linguistic metaphors, which, in spite of their elevation from prose to poetry via these transformations, nonetheless carry the semantic burdens ever present in the realm of the spoken, musical metaphors are entirely free from such yokes; and it is for this reason that Bernstein demands a semantically unbounded hearing of a piece laden with extra-musical references: Beethoven’s ‘Pastorale’ Symphony.

By suspending the associations induced by the piece’s non-musical blurbs (e.g. ‘The Awakening of Cheerful Feelings on Arriving in the Country’) and onomatopoeic bird calls and shepherds’ pipes, Bernstein hopes to enable the listener to ‘hear music as music only,’ thereby taking an essentially formalist position. He analyses the transformational processes by which repetition, key to metaphorical construction and inherent in music even where it is only implied, is ‘[prevented] from becoming

53 L. Bernstein, op. cit., 123-127
54 L. Bernstein, op. cit., 131
55 L. Bernstein, loc. cit.
56 L. Bernstein, loc. cit.
57 L. Bernstein, op. cit., 189
garden-variety boredom’ in the first movement of the symphony. He indicates that Beethoven violates the listener’s intuitive expectation of sequential symmetry in the first movement by varying repeated fragments slightly, thereby avoiding verbatim reiterations, and thus prompting a response entirely unrelated to the movement’s extrinsic associations. Likewise, the intrinsic metaphor created by the simultaneous duplication of a fragment in the violins and viole, the former of which can be easily heard, in contrast to the latter which are less acoustically advantaged, appeals to the listener’s instinctive identification of harmonic relevance, the exact significance of which is obvious only to the most experienced audience members.

Having elucidated Bernstein’s interpretation and application of the transformational generative analytic framework, some consideration must be given to the methodological accuracy and viability of his approach. The most comprehensive critique of the linguistic claims of the Norton Lectures is offered by Keiler in his article ‘Bernstein’s ‘The Unanswered Question’ and the Problem of Musical Competence’ (1978), and it is to this material that principal focus will be given. Due attention will also be paid to the response to this article elicited from Jackendoff and Lehrdal (1980), and to Keiler’s defence of his hypotheses; and in the following section, further criticisms of Bernstein’s linguistics will be proffered.

Keiler’s critique of Bernstein

58 L. Bernstein, *op. cit.*, 163
59 L. Bernstein, *op. cit.*, 167
60 L. Bernstein, *loc. cit.*
Keiler (1978) begins his critique of Bernstein’s linguistics by acknowledging ‘[his] popularity and appeal to a diverse audience,’\(^6\) and concedes that Bernstein’s universal and essentially human conception of music is ‘certainly correct’, and in this sense potentially fit for linguistic analysis.\(^6\) In the construction of a comparative paradigm, Keiler suggests, it would be necessary to focus on competence – in the musical counterpart of the linguistic analogy, the inborn mental musical structures employed by the listener in the cognition of sound, identification of styles etc. – rather than performance, such that the resulting theory of musical analysis could provide a framework for understanding all musical comprehension.\(^6\) This would accommodate for ethnomusicological evidence supporting a universalist hypothesis of a genetic inheritance of musical perception and acquisition, such as that propounded by John Blacking (1973).\(^6\) Beyond this, however, Keiler finds that the ‘Lectures cannot be considered a well-conceived or rigorous contribution to… interdisciplinary study,’ and while he rejects the idea of a systematic elucidation of all of the faults present throughout Bernstein’s linguistic propositions on the premise that this ‘would be tedious,’ he nevertheless clarifies some points of contention.\(^6\)

The first of these points relates to the interdisciplinary transference of linguistic paradigms to musical analysis, Bernstein’s very search for a ‘musico-linguistics,’ which represents for Keiler a ‘false start’ and an ‘invitation to confusion, if not disaster.’\(^6\) Indeed, it is a pursuit against which even Chomsky himself had warned: ‘the problem of extending concepts of linguistic structure to other cognitive

\(^6\) A. Keiler, *op. cit.*, 203
\(^6\) A. Keiler, *op. cit.*, 203-4
\(^6\) John Blacking, *How Musical is Man?* (Seattle, 1973), 7
\(^6\) A. Keiler, *op. cit.*, 198
\(^6\) A. Keiler, *op. cit.*, 197
systems… [is] in not too promising a state. 67 The particular relationships between branches of linguistic research, Keiler argues, exist as a consequence of the specific quirks of the study of language, and thus attempts to base musical analogies on these relationships, rather than those arising explicitly from the study of music, would yield results that are, at best, ‘dangerous’ and ‘trivial.’ 68 Independent evidence, he concludes, must support such cross-disciplinary relationships – the likes of which was unavailable or inadequate at the time of writing.

In addition, Keiler regards the evidence for the origination of cross-culturally prevalent scales from the overtone series made in Lecture 1 as grossly inadequate. He argues that Bernstein’s claims are ‘supported by the broadest sleight-of-hand’ and ‘dressed up with pseudolinguistic arguments,’ 69 dependent on the manipulation of harmonic partials present only in the farthest regions of the overtone series, and thus representing the procedure… of a desperate man who tenaciously clings to the overtone series at all costs. 70 He further rejects the reference to the Indonesian sléndro scale as verification of the significance of the overtone series on the premise that there exists no veritable intervallic relationship between the series and Gamelan music, and, citing the work of Becker and Becker, claims that the intervals used in this style may vary from smaller than a semi-tone to greater than a tone, and indeed between particular instruments. 71

Keiler thus concludes that Bernstein’s claim regarding the universality and innateness of the overtone series ‘amounts to arguing that everything is equally possible’, leaving

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67 N. Chomsky, Language and Mind (New York, 1972), 75
68 A. Keiler, op. cit., 207
69 A. Keiler, loc. cit.
70 A. Keiler, op. cit., 208
71 A. & J. Becker, A Grammar of Musical Genre Srepegan, mimeographed, University of Michigan
room for no conceivable counterexample\textsuperscript{72} – certainly not an unconventional anti-universalist stance. Keiler notes that the significance of any one set of universals – linguistic or musical – lies in the fact that it represents one of many potential arbitrary systems.\textsuperscript{73} Since there are no a priori reasons why any one set should be valid, verification between languages is greatly significant for the systemic schemata, and thus the lack of empirical testability of Bernstein’s grammar constitutes untenable grounds for a theory of musical competence.

A further problem with Bernstein’s work is the apparent shift of focus from musical competence to performance in his treatment of grammatical universals. Keiler notes that Bernstein’s notion of competence as ‘our inbuilt capacity to construe those naturally serialised overtones, and to construe them in different ways’\textsuperscript{74} betrays acknowledgement of the arbitrary internal logic of linguistic and musical systems as unrelated to physical facts. However, it simultaneously places emphasis on musical performance – the perception of musical sounds – rather than competence – the innate mental structures enabling comprehension of those acoustic phenomena. The resulting theory of musical competence, Keiler claims, illuminates the underlying structures through elucidation of the musical sounds, which amounts to a reversal of the essential requirements of an adequate theory, a misunderstanding supposedly prevalent in even the best-acclaimed tomes in the literature.\textsuperscript{75}

Another issue identified by Keiler is the over-emphasis on substantive, rather than formal, universals in the second Lecture. The former, Keiler explains, are represented

\textsuperscript{72} A. Keiler, \textit{op. cit.}, 208
\textsuperscript{73} A. Keiler, \textit{loc. cit.}
\textsuperscript{74} L. Bernstein, \textit{op. cit.}, 30-31
\textsuperscript{75} See e.g. L. B. Meyer, \textit{Emotion and Meaning in Music} (Chicago, 1956)
by a lexicon of phonological oppositions which are irrelevant beyond linguistic study, since they do not derive directly from physical facts (e.g. human physiology, pattern of sound waves etc.), but rather reflect specific issues arising from the practice of trans-lingual description. The result of this is evinced in the confusion of different parts of language as in the case of ‘deaduck,’ in which Bernstein becomes ‘sidetracked from pursuing the musical aspect of this problem by his search for an appropriate linguistic analogy,’ and fails to realise that ‘dead duck’ does indeed become ‘deaduck,’ a common consequence of problems arising from difficulties in segmenting surface forms to reveal adequate class assignments.

Bernstein’s ‘Cruel Fate Waltzes’ presents a similar distortion. In the case of language, the relations between parts of speech exist syntagmatically – i.e. in a pre-determined linear order – whereas in the musical analogy, they exist only simultaneously. Thus Bernstein’s reduction of the mock triad ‘sentence’ ‘Jack loves Jill’ to ‘noun’ form, despite the presence of both a noun and verb in the statement, and the further derivation of an adjective from it, as discussed previously, amounts to a fundamental and entirely counterintuitive linguistic confusion.

Keiler’s claims, while proffering much material for consideration, ought themselves to be scrutinised. They elicited a critical response by analysts Jackendoff and Lerdahl (1979-1980), who argue that Keiler has confused the notion of the ‘discovery procedures’ through which rules of grammar are established by generative linguists with the actual class of analytic statements derived from the stimulus object – the

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76 A. Keiler, op. cit., 211
77 A. Keiler, op. cit., 211-212
musical surface structure – a claim supported by Keiler’s neglect of formal rules of musical grammar in the explication of those analytic statements. Thus it appears to them that he ‘[misses] the point of generative grammar altogether.’

Jackendoff and Lerdahl’s criticisms were dutifully noted by Keiler. In an article of 1979-1980 written in his defence he notes that the charges made by Jackendoff and Lerdahl appear to be based on one particular parenthesis which was followed by substantial evidence negating their claims. Regarding the over-emphasis on analytic statements surrounding given stimulus objects, Keiler directs the reader to Section 3 of his analysis of the Norton Lectures, in which he discusses the inadequacy of Bernstein’s musings resulting from the absence of more than the physical parameters of the observed stimulus object. Indeed, his comment that by the end of their exposition, Jackendoff and Lerdahl’s criticism ‘[had] grown to gigantic proportions,’ against which it was ‘difficult to respond… in any substantive way without… being forced into playing the authors’ game’ does seem well-placed. It should also be noted that Jackendoff and Lerdahl’s attention is aimed at a review written by Keiler of a text by Eugene Narmour, which Jackendoff and Lerdahl consider ill-acquainted with linguistics itself, apparently premised exclusively on Chomsky’s ‘Syntactic Structures’ and Ian Robinson’s ‘The New Grammarians’ Funeral’ (1975), the latter of which Jackendoff and Lerdahl brand as ‘totally incompetent,’ and not primarily Keiler’s critique of the Norton Lectures, although reference to it is certainly made. Thus, while it might be useful to consider Jackendoff and Lerdahl’s criticisms of

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79 R. Jackendoff & F. Lerdahl, op. cit., 509
81 A. Keiler, op. cit., 512
82 A. Keiler, op. cit., 511
83 E. Narmour, Beyond Schenkerism: The Need for Alternatives in Music Analysis (Chicago, 1977)
84 R. Jackendoff & F. Lerdahl, op. cit., footnotes
Keiler’s approach in evaluating the validity of his review of Bernstein’s Lectures, these ought nonetheless to be viewed with some wariness.

**Further responses to Bernstein’s linguistics**

Other counterintuitive elements of Bernstein’s work are worth mentioning. His insistence on music as bounded within the realm of the aesthetic suggests some confusion as to the relationship between language and music. On the one hand, Bernstein aims to find structural parallels between the two; on the other, he insists on a distinction between the dual communicative and aesthetic functions of the former, and the purely aesthetic function of the latter. To separate between structural and functional characteristics in building a comparative paradigm raises issues that are both swept under the carpet and entirely unaddressed. Moreover, throughout his exposition he ignores his initial statement regarding the birth of the first musical note ‘MA’, which implies a conception of music as fundamentally communicative, an inconsistency which undermines his notion of music as an exclusively aesthetic entity.

It may even be argued that, while music might not be communicative in the sense that its acoustic phenomena do not represent specific non-musical ideas, nonetheless the very fact of its function as the delivery of the intent of the composer to an audience places it in the realm of the communicative.

Bernstein’s exposition on musical metaphors should also be addressed. The notion of a time delay involved in the cognition and interpretation of linguistic metaphors may indeed be valid; but Bernstein provides no substantial evidence to support his claim that no such delay exists in the hearing of musical metaphors. His example of the
violin/viola metaphor in the ‘Pastorale’ symphony relies on a holistic perception of
the metaphor prior to its unfolding before the listener. However, as has been argued
extensively by L. B. Meyer (1956), among others, it is clear that the significance of
any grammatical transformation can exist only as a consequence of its relationship
with those that follow it, and thus can only be perceived retrospectively once the
chain of musical events in question has been heard in its entirety.\(^85\) Indeed, it is the
very capacity of grammatical transformations to violate the expectations initiated by
earlier deep structure strings that facilitates music’s greatest dramatic aspect.

Similarly, Bernstein’s appeals to the perception of ‘music as music only’ present
certain difficulties. It may be argued that such a task is impossible on the grounds that
it is precisely those seemingly inevitable associations inherent in musical expression
that endow it with its meaning: that it is the cognitive reference to previously felt or
imagined experiences that allows the listener to engage meaningfully with the musical
piece, or indeed with any work of art. More basically, this is a psychological issue; it
may be the case that no human experience can be registered and contextualised
without reference to the aggregate feelings acquired by the individual in question.
Even if one were to attempt to suspend associative thinking when listening to the
‘Pastorale’ symphony, the sounds involved might nonetheless arouse certain affective
responses related to the time, place or emotional state of previous hearings, and it may
be in this responsive sequence that the meaning of music is revealed.

Likewise, Bernstein’s portrayal of the relationship between musical sounds and the
non-musical concepts they represent is problematic. In contrast to the classic

\(^85\) L. B. Meyer, *op. cit., passim*
Saussurian signifier/signified paradigm, according to which the sounds phonically representing an abstract concept are arbitrary and unrelated to the physical fact of the concept, Bernstein requires that musical sounds be both signifier and signified simultaneously, as suggested in his assessment of the ‘Fate’ motto in Lecture 2. This is something which he does not fully address, or approaches with some confusion. If one were to pursue a notion of an innate and universal capacity for musical perception akin to Chomsky’s model for a universal grammar, it would be necessary to follow the analogy that all languages, constituting arbitrary phonemes representing physically unrelated abstract concepts, can be interpreted by one grammatical mechanism, and likewise that all kinds of music, constituting arbitrary sounds representing themselves, can be understood as individual and distinct grammars. One would however reach a logical cul-de-sac if one were to continue to maintain the significance of the overtone series, as this would amount to claiming that there is one single musical language, rather than this multitude of distinct but structurally related languages.

Bernstein’s claims to an overarching universalism are also somewhat problematic, and it would not be unfair to evaluate his view as generally outdated. His approach has been largely overtaken by a more open-ended outlook, throughout social science fora and in particular in ethnomusicological study. The structuralist paradigm from which Chomsky and Bernstein’s theses arose has been quashed by post-modernist thinkers such as Jacques Lacan, and indeed it has been suggested that Chomsky’s work, while set to supplement the inadequacies of structuralist linguistics, nonetheless

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86 See e.g. *Écrits* (New York, 1966)
remains within the structuralist framework from which Chomsky had originally been educated.

Finally, it is necessary to reiterate Bernstein’s self-assessment as ‘quasi-scientific’. While it certainly indicates a consciousness of the incompleteness of his claims and the questionable adequacy of the evidence proffered in their support, such a quick excuse arguably diminishes the credibility of the examples he does provide and does not absolve Bernstein from the necessity of providing the means to substantiate his grandiose thesis.

**Contemporary support for Bernstein’s notions of musical innateness and universalism**

In spite of the aforementioned methodological shortcomings of Bernstein’s search for a ‘musico-linguistics’, there exists an overwhelming corpus of evidence in support of his intuited link between language and music which was unavailable at the time of its conception. Research in the fields of neuroscience and evolutionary biology has yielded illuminating results supporting theses of a viable analogy between language and music cognition, and a musical monogenesis respectively.

Recent progress in the cognitive sciences points to a neural relationship between language and music and validates the search for a ‘musico-linguistics’.

Neuropsychological research indicates distinct capacities or ‘domain specificity’ for musical and non-musical hearing, as evinced by Peretz et al (2004), whose assessment of a case of ‘acquired amusia’ resulting from focal brain damage in which the patient
could recognise pitch and short melodic contours but not tonality, supports a thesis of non-overlapping brain network specialisation for syntactic musical comprehension. Conversely, developments in neuro-imaging point to a theory of domain-generality, by which the same neural networks are used for both musical and linguistic cognition, such as Maess et al’s findings of early right anterior negativity (ERAN) typically elicited in parallel linguistic functions (2001). Reconciliation of this disparity is offered by Patel (2011), who proposes a resource-sharing framework by which the brain is believed to compete for neural resources between the two domain-specific associative frameworks used for language and music respectively, which he claims can be tested where simultaneous resource-structural integrations in both domains interfere with each other, as shown in Kolesch et al’s 2005 study in which syntactically erroneous words were paired with out-of-key chords in tonal music to produce a non-additive imbalance in the Left Anterior Negativity (LAN) readings associated with linguistic syntactic incongruities. While these findings may not serve to advocate Bernstein’s approach per se, they certainly support claims to a deeply rooted connection between language and music.

Research in evolutionary biology also validates ongoing attempts to uncover this connection, and goes some way to substantiate Bernstein’s claims to a musical monogenesis. Darwin’s hypothesis that human musical behaviours originated in a protolinguistic hominid phase as posited in ‘The Descent of Man’ has generated much investigation into the birth of social musicality. Stephen Mithen’s conception of a ‘Hmmm’ (‘Holistic, manipulative, multimodal, musical and mimetic’) model of

88 A. Patel, op. cit., 18
89 C. Darwin, The Descent of Man (London, 1871), 881
Neanderthal music-making suggests that, while language and music functions may operate co-terminously in modern humans, ‘singing’ Neanderthals who acquired the capacity to communicate verbally experienced a decline in musicality.\textsuperscript{90} Likewise, Stephen Pinker’s claim that music evolved as a superfluous cognitive function alongside language – a veritable ‘cheesecake’ in the otherwise nutritious neural larder\textsuperscript{91} – invigorates debates regarding the evolutionary development of music. It should be noted that much of the evidence for these arguments is relatively new, with only some twenty years passing since consensus had been reached that European Neanderthals lacked linguistic capacity but preceded \textit{Homo sapiens sapiens} in tool use and brain size, and merely ten since musical perceptiveness was recorded in rhesus monkeys.\textsuperscript{92} Nonetheless, the growing corpus of data for an evolutionary grounding for the intuited language-music connection does contribute much to the notion of a valid comparative paradigm and monogenetic source.

Thus it is clear that contemporary research has provided verifiable links between language and music which could not be substantiated at the time at which they were conceived and propounded by Bernstein. Were this information available, his claims might not have appeared to require quite the leap of faith which, for Keiler and others, seemed too great for serious consideration.

\section*{Conclusion}

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{91} S. Pinker, \textit{How the Mind Works} (New York, 1997) \textit{passim}
\item \textsuperscript{92} P. Vandermeer, \textit{loc. cit.}
\end{itemize}
\end{footnotesize}
The ‘quasi-scientific’ search for a universal Chomskian ‘musico-linguistics’, premised on the belief in an innate musical competence founded on the apparent omnipresence of the harmonic scale, was presented by Bernstein in his Norton Lectures in 1973. The analogical framework constructed by Bernstein from the fundamental tenets of generative transformational grammar has been critiqued by Keiler, and leaves much to be desired in terms of accuracy and consistency, leading one to question the very aim of developing a systematic structural comparison between language and music. However, there exists overwhelming evidence in the fields of neuroscience and evolutionary biology today which suggests that some comparative paradigm might be of use for the audience and performer.

In spite of the methodological shortcomings of Bernstein’s attempt to map the generative transformational framework directly onto a musical counterpart, there still remains much of value in his endeavours. His Norton Lectures served to connect between language and music in a thought-provoking manner, tapping into the intuition of a ‘musical language’ which is one that would undoubtedly be uncovered with minimal probing even in those dealing most tangentially with the performing arts in their daily lives. Perhaps more significantly, Bernstein brought a subject which would otherwise remain in the narrow realms of specific discoursivity to public attention and in a way that is comprehensible and accessible to all audiences, with a particular charisma and charm that made his claims all the more convincing, further facilitated by the broadcasting of the Lectures on television which propagated his ideas to an even greater audience than could be present in person. For those who engage with the Western tonal tradition on a vocational level, Bernstein can be seen to provide a critical tool with which to approach the process of deciphering the intent of
the composer as expressed in a particular musical work. By employing a grammatical analysis of a given piece, performers may find a path to better understanding the meaning encoded by the composer and thus deliver the musical message more faithfully; indeed, this had been Bernstein’s own intention\(^93\) — rather understandable, coming from a composer himself.

It appears that Bernstein’s main flaw has been his zealfulness in attempting to connect the musical and linguistic frameworks too closely, his desire for procedural scrupulousness which inevitably fell short even of the description as ‘quasi-scientific’; it was this eagerness which brought about the ‘sleight of hand’ identified by Keiler and its subsequent methodological fallacies. If, however, one has the foresight to look beyond this unarguably human enthusiasm, what remains is a legacy of innovation and fresh intellectual thought which continues to resonate with and inform the musical approaches of musicians and nonprofessional music lovers today.

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