The informed performer : towards a bio-culturally informed performers' practice

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Chapter 10: Looking for common ground

In PART I, and in the previous chapter, a conceptual way out of the classic dichotomies between information and imagination, and between theory and practice was proposed by triangulating and processualizing these divisive dualities via the introduction of two mediating elements: the human *Image* as the target domain of information, and *personal theory* as a partner in dialogue with systematic theory and metatheory. It was claimed that the interposition of these intermedia is a structural pre-requisite in support of a *Generally Informed Performership* (or *Performers' Practice*) and a facilitator in constructively digesting information originating from extra-disciplinary fields of inquiry. In this chapter, we further assess the operationalisation of such a relation by looking for common ground on which musical practice could communicate with *academia*[314] on a structural basis. Our investigative strategy is one in which we explore the fields of *academia* (10.1) and *art practice* (10.2) to come via a practice-based extension of the concept of consilience to the advancement of a bio-cultural approach to music as a pragmatic and epistemic platform to dialogue with extra-disciplinary terrains. A bio-cultural perspective on performership is intended as a further specification of the notion 'general' in GIPP that was used until now to indicate the extension of informational interests beyond historical and philosophical fields of enquiry.

10.1 Navigating *academia*

Coming to grips with the vast field of knowledge production in terms of organisation and classification is a longstanding concern that is even more acute in the present age of disciplinary fragmentation and specialisation than in the past. We already encountered Aristotle's seminal three-partite, product-oriented division, Bacon's faculty-driven organisation, Machlup's pragmatic approach, and there is – not explicitly mentioned yet – the division of *academia* in disciplines (Stichwech, 2001) which all could serve as a basis for developing an epistemic compass in the world of university scholarship. Evidently, it is not within the reach of this investigation to present an extensive treatment on this issue here. Our ambition is more focused and will therefore be limited to a basic classification that follows the inception of modern science in the seventeenth century: the division between the sciences and humanities (Gould, 2011, p. 18) also referred to as the two cultures debate (Snow & Collini, 1959/2012).

[314] *Academia* is used here as a collective for "the world of university scholarship" [OED, *academia*, def.2]. The term is as such also prominently used in Henk Borgdorff's *The Conflict of the Faculties: Perspectives on Artistic Research and Academia* (2012).

10.1.1 Two (or more) cultures?

The original motive for the 'two cultures' divide (Snow & Collini, 1959/2012) finds its origins in late-seventeenth-century intellectual life as a debate between the *Ancients* and *Moderns* [*La Querelle des Anciens et des Modernes*]. The conflict starts of as a literary and artistic debate on progress in the arts and then leads into a more general opposition between classic- and renaissance-thinking *versus* a modern confidence in progress and in the scientific method as a means to arrive at a better, future world. Many early leaders of the scientific revolution boost the modern cause by championing the power of new knowledge – based on observation and experiment – over the renaissance penchant which considers ancient wisdom as the best recipe for intellectual growth. With the arts as primary battle-field, the *Moderns* believe that, akin to scientific practice, also new forms of writing must necessarily surpass ancient styles while supporters of the *Ancients* argue that science's insistence upon the supremacy of novel discovery cannot be transferred to the field of literature and culture. The literary Ancients thus differentiate between the accumulative character of science and the absence of such a process of improvement in the more subjective and additive domain of literary style: "the core of the debate between Ancients and Moderns, after all, [resides] in a literary struggle, not in a contest between science and the humanities" (Gould, 2003/2011, pp. 84–85).

The debate extends further into a generic and methodical direction when hermeneutical philosophers, such as Friedrich Schleiermacher (1768-1834) and Wilhelm Dilthey (1833-1911), postulate a difference between '*Verstehen*' [to understand] and '*Erklären*' [to explain], and apply these two notions to the humanities [*Geisteswissenschaften*] and sciences [*Naturwissenschaften*] respectively: in the humanities, internal, lived experiences are studied by means of a hermeneutical, interpretative method, whereas the sciences study external objects captured by the senses and then subjected to a process of further experimentation and explanation.

> The term 'understanding,' as it is first applied to an individual inner state, designates the interpretation of that psychic state in the context of the whole of psychic life and conditioned by its milieu. In the realm of human affairs this [term] corresponds to what we designate as 'explanation' in the realm of knowledge of nature. Strictly speaking, explanations of human affairs can be expected only to the extent that a reduction to exactly definable (and preferably quantitatively determinable) external facts is possible. But understanding is the domain of all who are actively involved in human affairs, and differs from explanation by participating in life, which is possible only on the basis of life.[315] (Dilthey, 1883/1989, p. 439)

A more general awareness of an apparent duality gains urgency when novelist and scientist Charles Percy Snow (1905-1980) advances the notion of 'two cultures' in the *Rede Lecture* delivered at

[315] In the social sciences, the two approaches can be combined, a point stressed by German sociologist Max Weber (1864-1920).

Cambridge University in May 1959. Writing in the middle of the twentieth century, Snow draws on his life experience both as a working scientist and as a modestly successful novelist. He observes a growing gap between literary intellectuals and professional scientists: the two cultures are not only speaking different languages but also live in 'two galaxies' (Solymosi, 2013, p. 85).

> I believe the intellectual life of the whole of western society is increasingly being split into two polar groups. […] at one pole we have the literary intellectuals, who incidentally while no one was looking took to referring to themselves as 'intellectuals' as though there were no others […] — at the other scientists, and as the most representative, the physical scientists. Between the two a gulf of mutual incomprehension — sometimes (particularly among the young) hostility and dislike, but most of all lack of understanding. They have a curious distorted image of each other. Their attitudes are so different that, even on the level of emotion, they can't find much common ground. […] The non-scientists have a rooted impression that the scientists are shallowly optimistic, unaware of man's condition. On the other hand, the scientists believe that the literary intellectuals are totally lacking in foresight, peculiarly unconcerned with their brother men, in a deep sense anti-intellectual, anxious to restrict both art and thought to the existential moment […] This polarisation is sheer loss to us all. To us as people, and to our society. It is at the same time a practical and intellectual and creative loss. (Snow & Collini, 1959/2012)

In a second edition of *The Two Cultures*, published in 1963, a new essay is added, *The Two Cultures: A Second Look*, in which Snow rather optimistically suggests that a new 'third culture' is about to emerge and will close the communications gap between the literary intellectuals and the scientists. However, no structural platform is offered by Snow to systematically operationalize and back-up this evolution.[316]

Next to Snow's observations, another landmark in the two-cultures-debate surges around the millennial transition when scholars revisit a variant of the divide under the notion of the 'Science Wars', a scholarly conflict between 'realists', scientists who uphold the objectivity and progressive nature of scientific knowledge, and 'relativists', postmodern scholars housed in faculties of the humanities and social sciences who regard science as just one system of belief among many alternatives and stress the culturally embedded status of all claims for universal factuality (Gould, 2003/2011, pp. 18–19). The stage for the conflict is set by Paul R. Gross and Norman Levitt, a biologist and a mathematician respectively, in *Higher Superstition: The Academic Left and Its Quarrels with Science* (Gross & Levitt, 1994). The authors counter politically activist attacks upon science generated by humanists and social scientists who, in their view are ignorant of both the workings and the content of the physical and biological sciences. The science wars rise to a climax in 1996 with the publication of a special issue of the journal *Social Text* devoted to the science wars. In 'Transgressing the Boundaries: Toward a

[316] In *The Third Culture* (1995), author John Brockman claims the emergence of a third culture where scientists are communicating directly with the general public: "third-culture thinkers tend to avoid the middleman and endeavour to express their deepest thoughts in a manner accessible to the intelligent reading public" (Brockman, 1995, p. 18).

Transformative Hermeneutics of Quantum Gravity' (Sokal, 1996a), physicist Alan Sokal offers a postmodern interpretation of some fundamental issues in physics (the unification of quantum mechanics and general relativity) but shortly after publication Sokal admits the satiric quality of the paper intending to demonstrate that much postmodern scholarship is intellectually vacuous. Sokal articulates his justification for the hoax as follows:

> One of my goals here is to make a small contribution toward a dialogue on the Left between humanists and natural scientists – "two cultures" which, contrary to some optimistic pronouncements (mostly by the former group), are probably farther apart in mentality than at any time in the past fifty years.[…] my main concern isn't to defend science from the barbarian hordes of lit crit (*sic*) Rather, my concern is explicitly political: to combat a currently fashionable postmodernist/poststructuralist/social-constructivist discourse—and more generally a penchant for subjectivism—which is, I believe, inimical to the values and future of the Left. (Sokal, 1996b, pp. 338–339)

The hoax becomes the object of a legendary academic controversy: on the one side the radical scientists committed to the notion of objective truth in science, on the other side a group of sociologists, historians, philosophers of science, and other postmodern intellectuals; they view science as a social construction, arguing that science should not be granted the status of final arbiter of ultimate truth.

From a more neutral standpoint, sociologist Basil Bernstein analyses the duality in terms of two distinctive knowledge structures within a vertical discourse[317] (see Fig. 10.1):

> A vertical discourse takes the form of a coherent, explicit, and systematically principled structure, hierarchically organised, as in the sciences, or it takes the form of a series of specialised languages with specialised modes of interrogation and specialized criteria for the production and circulation of texts, as in the social sciences and humanities. (Bernstein, 1999, p. 159)

In a hierarchical knowledge structure, the knowledge is integrated; the concern is not to invent new terms or nuances for existing elements such as a 'molecule' or 'energy', rather the goal is to accumulate context-independent bits of knowledge. In a horizontal knowledge structure the production of knowledge is tied to specific segments and context of human existence and leads to the development of idiosyncratic, parallel languages. An example of such a development can be found in the satellite terms that encircle practical knowledge; there we find a number of concepts with comparable semantics: practical knowledge, knowing how, tacit knowledge, personal knowledge,

[317] Bernstein opposes vertical discourse to a horizontal discourse. The latter is 'common-sense' knowledge: a form of knowledge which it is likely to be "oral, local, context dependent and specific, tacit, multi-layered, and contradictory across but not within contexts […] the crucial feature is that it is segmentally organised" (Bernstein, 1999a, p. 159).

knowing in practice, experiential knowledge, artistic knowledge, intuitive knowledge, embodied knowledge, informal theory, personal theory (see for an overview Higgs & Titchen, 2001, pp. 37–39).

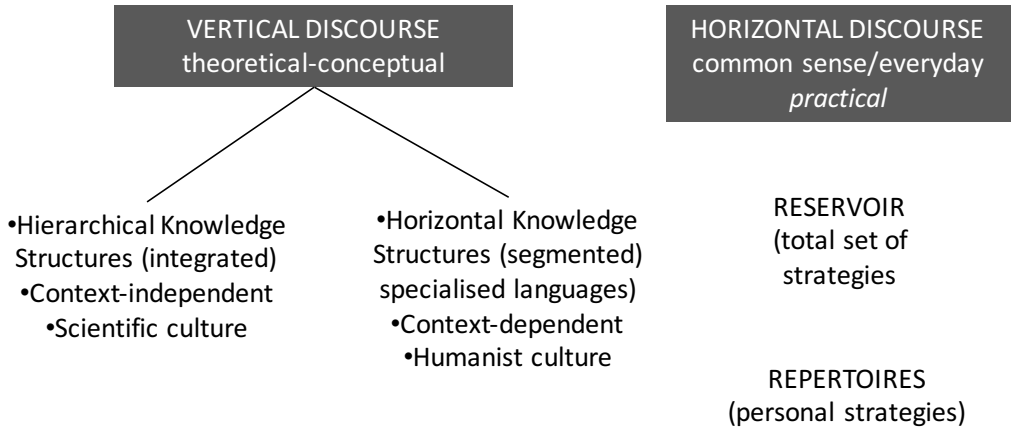

Figure 10.1: Basil Bernstein's view on the two cultures within vertical discourse.

In *The Three Cultures: Natural Sciences, Social Sciences, and the Humanities in the 21st Century* (2009), psychologist Jerome Kagan includes the rise of a third separate culture, generally termed 'social sciences' and comprising the fields of sociology, anthropology, political science, economics, and psychology. This third culture has human life as its subject matter but approaches it with an experimental and scientific instrumentarium. Kagan's three-partite division conforms to what is generically known as the alpha-, bèta, and gamma-classification: the alpha-sciences study the products of human action (history, languages), the bèta-group studies non-human nature (physics, biology) and the gamma-sciences study human action itself (psychology, sociology, economy). Kagan identifies several dimensions of primary differences between the three cultures such as the primary questions asked, the sources of evidence, the vocabulary used, and the criteria of judgement. In his characterization of the three cultures, Kagan points especially to varying conceptions of "truth and the related notions correct, valid, coherent , and right " (Kagan, 2009, p. 40). Kagan presents four common ways in which scientists, social scientists, and humanists relate to truthfulness.

1. Correspondence: an idea is true when it corresponds to a real thing or event that exists outside of and independently of any observers. Kagan's example: "the moon is or is not present in the sky" (Kagan, 2009, p. 40).
2. Logical consistency: an idea is true when it does not contradict and/or offers logical support to other ideas known (believed) to be true – often seen as foundational or a priori. Kagan's example: "if velocity equals the ratio of distance over time then distance equal[s] the product of velocity and time" (Kagan, 2009, p. 40).
3. Semantic coherence: an idea is true when it fits with or seems highly plausible in light of the

larger contextual narrative woven to interpret or understand the facts of a case. Kagan's example: "a historian's suggestion at the end of a narrative of World War II that Churchill did not attend Roosevelt's funeral because of his lingering anger over being embarrassed by Roosevelt during their meetings with Stalin has a claim to truth if this idea strikes most readers as coherent with the complete text" (Kagan, 2009, p. 40).

4. Compelling feeling: an idea is true when it does effect specific emotions that are either pleasing or upsetting to the believer in her/his relation to the idea. Kagan's example: "the feeling accompanying the thought that parental sacrifice for a child is right and abuse is abhorrent" (Kagan, 2009, p. 40).

Even though Kagan recognizes that all four of these notions of truth can be found or are at work in each of the three cultures, he finds that natural scientists tend to trust only the first two; social scientists the first and third; and that humanists rely on the last two. Kagan concludes that some benefit may result from greater humility across the three cultures, through which each group recognizes that it is potent in its own territory but impotent in the territory of the other.

10.1.2 Towards consilience within Academia

Various constructions have been developed with a view to dissolute the apparent gaps between scholarly cultures. *Texts* have been granted a pervading a unifying role in deconstructivist philosophies and in neo-pragmatist thinking; other voices within the debate have claimed that by relegating the findings of the natural sciences to the sphere of texts and literature, these epistemic 'constructions' have the tendency to devaluate and annihilate the potential impact power of discipline-based research outcomes and eventually arrive at an epistemic *status quo.* In the remainder of this chapter, we will zoom in on one of these rival perspectives which is proposed mainly by natural scientists but has also infiltrated literary thinking. It is a line of thought generally referred to as 'consilience' and is best known from the work of (socio-)biologist Edward O. Wilson (°1929). By tracking the historical evolution of 'consilience' we can assess how this framework operates as a functional compass in navigating extra-disciplinary territories.

10.1.2.1 Intra-scientific consilience

Whewell starts of with empirical work in the field of mineralogy but his most distinctive work is situated in his contribution to the history and philosophy of science. Whewell's name is amongst other things connected to the coinage of the noun 'scientist' in an 1834 article in the *Quarterly Review* (see OED).

Whewell publishes a three-volume treatise on *The History of the Inductive Sciences* in 1837 (Whewell, 1837), followed three years later by *The Philosophy of the Inductive Sciences, Founded Upon Their*

History (Whewell, 1840). In both (monumental) works, Whewell focuses on arriving at conclusions, general laws, and theories via the accumulated and repeated observations and experiments with actual phenomena of nature rather than deducing particularities from first principles. In the 1840 treatise [vol.2, part II, book XI, chapter 5 & 6] the author introduces the notion of 'consilience' in relation to two modes of inductions. The first mode is a collection of facts that, after repeated observation, leads to correct predictions of facts of the same kind (for instance, most fluids expand when they freeze). Whewell however points to the limits of this mode of inquiry, it provides only general information about a limited set of objects. What he ultimately envisages is an inductive method that expands beyond the repeated observation of the same set of occurrences; Whewell terms it 'consilience of inductions'. In this second mode, instead of twenty observations on the same phenomenon, twenty entirely distinct and apparently unrelated observations about a set of objects are examined. This collection of unrelated facts does not make sense at first, no thread unites them into any communality. However, when one succeeds at recognizing that each of these apparently disparate facts can be made to cohere and if one kind of explanation can bring a diversity of facts together, one can speak of a higher form of understanding.

> The evidence in favour of our induction is of a much higher and more forcible character when it enables us to explain and determine cases of a kind different from those which were contemplated in the formation of our hypothesis. […] the cases in which inductions from classes of facts altogether different have thus jumped together, belong only to the best established theories which the history of science contains. […] I will take the liberty of describing it by a particular phrase; and will term it the Consilience of Inductions. (Whewell, 1840, pp. 230–231)

Whewell constructs the neologism 'consilience' from *salire* (lat. 'to jump'), and *con* (lat. 'together') to indicate the jumping together of items that appear to be so separate (Gould, 2003/2011, p. 209). For concrete examples of theories that synthesize an apparent mix of large numbers of complex and independent items under the explanatory rubric of a single causal theory, Whewell refers to the theory of universal gravitation and the wave-theory of light.

A next point in Whewell's argument on consilience is the way it can be related to truthfulness; good and true theories are identifiable by their capacity to simplify by subsumption and to harmonize apparently unrelated items with a single coordinating explanation. Whewell sees a promising future here for simplification and harmonization and supports this vision by the image of a river or a genealogical tree.

> The streams of knowledge from various classes of facts will constantly run together into a smaller and smaller number of channels; like the confluent rivulets of a great river, coming together from many sources, uniting their ramifications so as to form larger branches, these again uniting in a single trunk. The genealogical tree of each great portion of science, thus

> formed, will contain all the leading truths of the sciences arranged in their due coordination and subordination. (Whewell, 1840, p. 241)

10.1.2.2 Reductive consilience across the sciences and humanities

After Whewell's coining of the neologism, the term 'consilience' disappears from the epistemic radar until it is recovered at the end of the 20th century in Wilson's *Consilience: The Unity of Knowledge* (1998). Wilson, a biologist and a pioneer in the concept of socio-biology (Wilson, 1975), explicitly refers to Whewell's concept of *consilience* and rephrases the 'jumping together' of knowledge as "the linking of facts and fact-based theory across disciplines to create a common groundwork of explanation" (Wilson, 1998, p. 6). The use of the word 'explanation' refers directly to a scientific perspective on things as a point of departure to colonize the vast field of scholarly knowledge production and the reference to Whewell's consilience is followed by the formulation of a clear ambition, namely, to expand the possibility of consilience beyond science and across the great branches of learning including the social sciences and humanities. Referring to Snow's analysis of a gap between the humanities and the sciences (Wilson, 1998, p. 42), Wilson advocates a reductionist version of consilience as a basis for uniting the sciences and humanities.

> The natural sciences have constructed a webwork of causal explanation that runs all the way from quantum physics to the brain sciences and evolutionary biology […]. The explanatory network now touches the edge of culture itself. It has reached the boundary that separates the natural sciences on one side from the humanities and humanistic social sciences on the other. (Wilson, 1998, p. 136)

With regard to a perceived gap between the sciences and the humanities, Wilson sees a solution in the relation and interaction between 'biology' and 'culture'.

> There is only one way to unite the great branches of learning and end the culture wars. It is to view the boundary between the scientific and literary cultures not as a territorial line but as a broad and mostly unexplored terrain awaiting cooperative entry from both sides. The misunderstandings arise from ignorance of the terrain, not from a fundamental difference in mentality. The two cultures share the following challenge. We know that virtually all of human behaviour is transmitted by culture. We also know that biology has an important effect on the origin of culture and its transmission. The question remaining is how biology and culture interact, and in particular how they interact across all societies to create the commonalities of human nature. […] That, in my opinion, is the nub of the relationship between the two cultures. (Wilson, 1998, p. 138)

More concretely, Wilson proposes the concept of *gene-culture coevolution* as an answer to bio-cultural incongruity. This perspective implies that the mind is the brain at work, and culture is the creation of manifold individual minds composing a civilization wherein a cultural legacy is handed on from one generation to the next. Gene-culture co-evolution, in short, implies that the human lineage has added

to the process of genetic evolution the parallel track of cultural evolution, and, that the two forms of evolution interact intrinsically.

Wilson is convinced that genes influence human behaviour, but he is not a naive genetic determinist. He leans heavily on a notion borrowed from developmental genetics: genes lay down 'epigenetic rules', inherited regularities of development or predispositions[318] which affect and guide (not determine) how an organism looks or behaves. An epigenetic rule is an innate bias that depends more (or less) on the environment (natural and cultural) in which one is situated, to exert its influence. The trick is, according to Wilson, that these underlying genetic predispositions tend to trickle up, "bias[ing] cultural evolution in one direction as opposed to another, and thus connect[ing] the genes to culture" (Wilson, 1998, p. 164).

The epigenetic rules operate, according to Wilson, at two levels. Primary epigenetic rules are automatic and filter and code stimuli in the sense organs all the way to perception by the brain. It is hardwired. Secondary epigenetic rules are regularities in the integration of large amounts of information and draw on memory, experience and emotional colouring. They lead the mind to predisposed decisions through the choice of certain memes and overt responses over others (Wilson, 1998, p. 138).

As culture is reconstructed each generation in the minds of individuals and is transmitted orally or supplemented by writing or art, it can grow infinitely large; however, the fundamental biasing influence and role of the epigenetic rules, being genetic and deep-seated, stays constant according to Wilson. However, two points of view are defendable in relation to the impact ratio of genes: nurturists think that culture is held on a very long genetic leash, if held at all, so that the cultures of different societies can diverge from one another indefinitely; hereditarians believe the leash is short, causing cultures to evolve major features in common.

A final aspect to note in Wilson's thinking is that within the context of gene-culture co-evolution, free will can be rescued from the overall determinism of biological necessity. In Wilson's view, our sense of making choices for which we are responsible is a necessary adaptive illusion related our inevitable ignorance of the totality of material factors involved.[319]

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[318] A note on 'dispositions' and 'pre-dispositions': 'disposition' is a term that has been discussed extensively by Ryle in *The Concept of Mind* (Ryle, 1949). 'Disposition' generally refers to a potentiality (see Aristotle '*dunamis*') which implies a "natural tendency or bent of the mind" [OED, disposition, def. 6]; this meaning has generally lost ground in favour of an understanding of disposition as a (culturally) acquired action tendency. 'Pre-disposition' is then used to refer to a pre-existing tendency that has its origins in nature (the earliest examples mentioned in the OED date from the 18th century and relate to pre-dispositions offered by the seasons and the body).

[319] Physicist and cosmologist Stephen Hawking speaks of 'effective theories': "In the case of people, since we cannot solve the equations that determine our behaviour, we use the effective theory that people have free will. The study of our will, and of the behaviour that arises from it, is the science of psychology. Economics is also an effective theory, based on the notion of free will plus the assumption that people evaluate their possible alternative courses of action and choose the best. That effective theory is only moderately successful in

> So there can be no simple determinism of human thought, at least not in obedience to causation in the way physical laws describe the motion of bodies and the atomic assembly of molecules. Because the individual mind cannot be fully known and predicted, the self can go on passionately believing in its own free will. And that is a fortunate circumstance. Confidence in free will is biologically adaptive. Without it the mind, imprisoned by fatalism, would slow and deteriorate. Thus in organismic time and space, in every operational sense that applies to the knowable self, the mind does have free will. (Wilson, 1998, pp. 131–132)

Wilson's ultimate project is one of installing hierarchies of reductionism, from maximally complex sciences of large and complex systems, such as human societies, to minimal and mathematics-based theories about several basic particles that construct material reality.

Wilson's purpose in writing *Consilience*, lies in his firm belief (not a proven fact) that the chain of reductionism heretofore so successful in stretching from particle physics well into the reaches of biological complexity, is now able to make a move upward in beginning to understand the workings of the human brain, and then moving through the social sciences and eventually, and ultimately, into the traditional humanities of arts, ethics, and even parts of religion. According to Wilson the social sciences, and notably the fields of anthropology, sociology and economics, proceed by using solipsistic, self-referential systems governed by idiosyncratic sets of rules. Only when explanations of cultural and economic behaviours are carried back, largely by way of cognitive psychology, to their causal basis in biology will an analysis be grounded and scientific. Within such a consilient context, evocation of the meaning and quality of life and experience will continue to be the province of the arts, however, their appreciation will be enhanced by an informed criticism newly aware of a cultural and genetic basis. The choice between a transcendental and an empirical foundation for ethics for example will vanish, leaving only the latter, while religion will in this particular scenario be a vehicle for incorporating the highest values of humanity in the poetic form of myths consistent with reality.

As an example of consilience Wilson mentions the great success versus comparative failure between two disciplines for study of equally complex systems: the medical and the social sciences. This divergent evolution lies according to Wilson in the ability of medicine, and the failure of social science, to achieve reduction to sciences of more-basic constituents, better understood and more easy to manipulate (Wilson, 1998, pp. 197–198).

10.1.2.3 Consilience extended to the domain of literary studies

By the end of the 20th century a (small) section of the humanities, and especially literary studies, takes up Wilson's incentive and develops a specific interest in evolutionary theory as an alternative to

predicting behaviour because, as we all know, decisions are often not rational or are based on a defective analysis of the consequences of the choice" (Hawking & Mlodinow, 2010, p. 33).

postmodern relativism and traditional literary criticism. The 'literary Darwinists', of which evolutionarist Joseph Carroll (2004) is probably the most eminent representative, take to heart the vision of *The Descent of Man* (Darwin, 1871/1981), *Sociobiology: The New Synthesis* (Wilson, 1975), and *Consilience* (Wilson, 1998). Following Darwin, they sympathize with the idea that

> Man with all his noble qualities, with sympathy which feels for the most debased, with benevolence which extends not only to other men but to the humblest living creature, with his god-like intellect which has penetrated into the movements and constitution of the solar system—with all these exalted powers—Man still bears in his bodily frame the indelible stamp of his lowly origin. (Darwin, 1871/1981, p. 405)

Literary Darwinists recognize a genetic stamp not only in the human body but also in the human mind and advocate an intellectual unification in the manner of Wilson's *consilience*. Philosopher Noël Carroll summarizes this new movement in the humanities and art studies as follows:

> Explanations of the emergence and continued robust existence of art may profit from evolutionary considerations. And, sometimes, the history of art, as the cases of film and TV suggest, could be amplified by noticing the ways in which culturally and historically specific artistic problems may be successfully addressed by activating our nearly universal, evolved, cognitive, perceptual, and emotive capacities. That is, sometimes art history and human psychology may work hand in hand; art history may tell us what to look for, and then psychology may help us find it. It is time for the two cultures—the humanities and the sciences—to come together. And there may be no better meeting place than the topic of art and human nature. (Carroll, 2004, p. 105)

In this citation, we find a development that is already on its way in Wilson's discussion of consilience: there are no definite answers to be found either in the sciences nor in the humanities, hence a collaboration seems a logical opportunity.

In *A Biocultural Approach to Literary Theory* (2012), interdisciplinary scholar Nancy Easterlin further operationalizes this take on literary criticism by combining cognitive and evolutionary research with traditional humanist methods with the aim to open up new possibilities for literary interpretation. She pleas for a fair-minded and creative application of cognitive and evolutionary research and charts a middle course between "overly reductive approaches to literature and traditionalists who see the sciences as a threat to the humanities" (Easterlin, 2012).

10.1.2.4 A dialogical alternative to consilience: of foxes and hedgehogs

An interesting assessment of and critique on Wilson's concept of consilience is provided by palaeontologist and evolutionary biologist Stephen Jay Gould *in The Hedgehog, the Fox and the Magister's Pox: mending the gap between science and the humanities* (Gould, 2003/2011). Gould criticizes Wilson's project of reductionism by pointing to the emergence and contingency or randomness found in some complex, nonlinear or non-additive systems as main arguments *contra*

reductive consilience. By emergence is meant that new entities, properties, and interactions are found in complex systems which cannot be related to knowing the properties of the components, or of laws governing at the level of those components alone:

> If […] emergent properties simply do not exist at the lower level, and can't be inferred, as a consequence of their non-additive character, from knowledge of lower-level components or their interactions at their own level, then these properties have 'emerged' at the higher level, and have no standing within any reduced science on the consilient chain. (Gould, 2003/2011, p. 223)

Thus, reductionism can only fail in attempts to model, explain, or describe such high-level systems, and we must search for and depend upon new emergent principles embedded in these higher, more complex levels of being (Gould, 2003/2011, pp. 221–224).

Next to emergence, historical contingency is the second element which in some systems may cause effects that do not necessarily lead to a single causal attribution; therefore narrative and hermeneutic methods, drawn from the humanities, may be required rather than classical deductive mathematical formulas that aim at describing linear relations and consequences. Gould highlights evolution by natural selection as a primary example of how entities such as ourselves are not a necessary, but rather a contingent product: "unique historical events in highly complex systems happen for 'accidental' reasons, and cannot be explained by classical reductionism" (Gould, 2003/2011, p. 225). Gould goes back to Whewell's notion of consilience as a literal 'jumping together' in the mind of diverse facts or phenomena initially appearing as unrelated as a more promising avenue of cooperation between the sciences and humanities. The most instructive example of consilience in the history of science, according to Gould, is the establishment of a theory of evolution as the unifying principle behind the relationships and history of life.[320]

> Indeed, I would argue that *the Origin of Species* may achieve its most accurate sound bite of description as the most brilliant example ever constructed for the power and efficacy of consilience as a method of proof in natural history. Darwin could not "see" evolution by direct observation in the large, and he well understood that numerous cases of small change in observable time (breeds of pigeons or dogs, improvement of crop plants) do not prove that large transformations occurred by a similar natural cause. So Darwin used consilience as his primary method. […] Moreover, Darwin explicitly attacks creationism most severely for its failure to forge consilience. Over and over again, Darwin tells us how evolution makes coordinated sense of a set of observations, whereas creationism can only regard each separate item as distinct and wondrous. (Gould, 2003/2011, p. 211)

[320] NB: Darwin was a student Whewell's.

To deliver the material for such an integration of unconnected facts, Gould is a strong believer inholding onto the autonomy of several *magisteria*, or domains of interest, for producing manageable and punctual information.

So, Gould comes to defend a union of equals allying the sciences and humanities and based on autonomy and mutual respect, not on a hierarchy where the humanities are subsumed under a reductionist framework of physical science. Gould formulates his vision on the operationalisation of consilience by invoking two archetypical ways of coping with and adapting to a situation. He thereby refers to philosopher Isaiah Berlin[321] who divides writers and thinkers into two categories (Berlin, 1953/1997). On the one hand, hedgehogs view the world through the lens of a single defining idea (see Plato, Hegel, Nietzsche, Proust), try to keep out of harm's way but will use their one great trick if overtaken by the hunters' dogs: the animal rolls up into a ball, with its small head and feet, and its soft underbelly, tucked up neatly and completely within the enclosing surface of spines (Gould, 2003/2011, p. 4). Foxes, on the other hand, draw on a wide variety of experiences which cannot be boiled down to a single idea (see Herodotus, Aristotle, Desiderius Erasmus, Shakespeare, Goethe as primary examples of foxes); when pursued by hunters, foxes figure out a new and sneaky way to escape each time. When turning more punctually to the authorship of Leo Tolstoy, Berlin contends that Tolstoy escapes definition into one of the two groups and represents a hybrid form.

Gould sees in Berlin's treatment of literature two levels of metaphorical meaning for human contrasts. The first level speaks of psychological styles, often applied for quite practical goals.

> Foxes owe their survival to easy flexibility and skill in reinvention, to an uncanny knack for recognizing (early on, while the getting remains good) that a chosen path will not bear fruit, and that either a different route must be quickly found, or a new game entered altogether. Hedgehogs, on the other hand, survive by knowing exactly what they want, and by staying the chosen course with unswerving persistence, through all calumny and trouble, until the less committed opponents eventually drop away, leaving the only righteous path unencumbered for a walk to victory. (Gould, 2003/2011, p. 5)

The second level is about favoured styles of intellectual practice: diversify and colour, or intensify and cover.

> Foxes (the great ones, not the shallow or showy grazers) owe their reputation to a light (but truly enlightening) spread of real genius across many fields of study, applying their varied skills to introduce a key and novel fruit for other scholars to gather and improve in a particular orchard, and then moving on to sow some new seeds in a thoroughly different kind of field. Hedgehogs (the great ones, not the pedants) locate one vitally important mine, where their particular and truly special gifts cannot be matched. They then stay at the site all their lives, digging deeper (because no one else can) into richer and richer stores from a mother lode

[321] Berlin has also written extensively on the divorce between the humanities and the sciences. As representatives of both cultures, Berlin opposes the epistemic attitudes of Giambattista Vico and Voltaire (Berlin, 1980).

> whose full generosity has never before been so well recognized or exploited. (Gould, 2003/2011, p. 5)

Gould uses the fox and hedgehog as models for how the sciences and humanities should or could interact. He believes that neither pure strategy can work, but that "a fruitful union of these seemingly polar opposites can, with goodwill and significant self-restraint on both sides, be conjoined into a diverse but common enterprise of unity and power" (Gould, 2003/2011, p. 5). If we lose sight of the one overarching goal underneath the legitimately different concerns and approaches of these two great ways, then we are truly defeated. But the way of the fox cannot prevail either, because too great a flexibility may lead to survival of no enduring value — mere persistence with no moral or intellectual core intact. Gould advocates the virtue of fruitful union of apparent opposites.

10.1.2.5 Pragmatic consilience

In *What Science offers the Humanities: integrating Body and Culture* (Slingerland, 2008) linguist Edward Slingerland takes an explicitly pragmatist and naturalist approach to the relationship between the sciences and the humanities. In his view, the humanities have more to learn from the sciences than vice versa. He argues that, for the humanities to progress, its scholars need to take seriously contributions from the natural sciences – in particular research on human cognition – which demonstrate that any separation of the mind and body is entirely untenable. Slingerland promotes an outright, vertical integration:

> While the humanities do concern themselves with human-level structures of meaning characterized by emergent structures irreducible (at least in practice) to the lower-level structures of meaning studied by the natural sciences, they are not completely *sui generis*. If we are to take the humanities beyond dualistic metaphysics, these human-level structures of meaning need to be seen as grounded in the lower levels of meaning studied by the natural sciences, rather than hovering magically above them. (Slingerland, 2008, p. 9)

Central in the rapprochement between the humanities and the sciences is the notion of 'embodied cognition' or the idea that human cognition is inextricably grounded in, and structured by the body and its sensory-motor systems. According to Slingerland, this relation to a living body is the main bridge between the sciences and humanities.

Another element that is strongly present in Slingerland's account of consilience is the rejection of objectivism in favour of a pragmatism. He thereby adds a fifth perspective on truth to Kagan's four ways of looking at truthfulness (see 10.1.1). Objectivism holds that there is an objective reality independent of human activity and that this reality is discovered or revealed to humans through the activity of scientific inquiry. The pragmatic account of truth, as we saw in the previous chapter, is the notion that truth is the successful achievement of goals and that active engagement with one's

environment instead of passive representation of the world better accounts for our experience as embodied organisms embedded in biocultural environments. This take on truth is summarized by James in *Pragmatism, a New Name for Some Old Ways of Thinking* (James, 1907):

> [truth means] that ideas (which themselves are but parts of our experience) become true just in so far as they help us to get into satisfactory relation with other parts of our experience, to summarize them and get about among them by conceptual short-cuts instead of following the interminable succession of particular phenomena. Any idea upon which we can ride, so to speak; any idea that will carry us prosperously from any one part of our experience to any other part, linking things satisfactorily, working securely, simplifying, saving labour; is true for just so much, true in so far forth, true instrumentally. (James, 1907/1922, p. 58)

In the introduction to *Creating Consilience: Integrating the Sciences and the Humanities* (Slingerland & Collard, 2012), published a few years later, Slingerland already adopts a more nuanced with regard vertical integration:

> Consilience is often framed in terms of bringing the study of humanistic issues into the same framework as the study of non-human species and non-biotic phenomena […]. However, we think this way of describing the undertaking is not only unhelpful but also inaccurate. It is unhelpful in that it can give the impression that consilience involves the sciences engulfing the humanities […]. It is inaccurate because it was clear, before the consilience project was initiated, that significant changes would have to be made to the framework used to study non-human species and non-biotic phenomena in order to deal with a number of humanistic issues. Thus, in our view, it is better to think of consilience as an attempt to develop a new, shared framework for the sciences and humanities. (Slingerland & Collard, 2012, p. 4)

Slingerland formulates the elements of such a framework under the label of a 'second wave' of consilience and advances three key-elements in support of it. First, the second wave of consilience should move beyond eliminative reductionism and respect emergent levels of truth (see Gould's crictism). A kind of dual consciousness is in order that cultivates the ability to view human beings simultaneously under two descriptions, as physical systems and as persons: "on the one hand, we are convinced that Darwinism is the best account we have for explaining the world around us, and, therefore, that human beings are merely physical systems. On the other hand, we cannot help but feel the strong pull of human-level truth" (Slingerland & Collard, 2012, p. 28). Secondly, within the context of the nature-nurture debate it should accepted that culture and genes exist in a co-evolutionary relationship, and that human culture can play a role in transforming human cognition on both individual and evolutionary time scales (see Wilson). Finally, disciplinary chauvinism should make place for recognizing that consilience is a two-way street.

10.1.2.6 Reconstructive consilience

In a chapter in *the Handbook of Neurosociology* (Franks & Turner, 2013), philosopher Tibor Solymosi[322] advocates a reconstructive consilience which requires the tying together of the advances in cognitive neurobiology with the insights of 'classical' pragmatism. For his project, Solymosi leans specifically on Dewey's idea of the abandonment in philosophy of searching for absolute truth favours instead the application of scientific principles to our practical understanding of moral and social life (Dewey, 1920). Solymosi considers the conflict between science and the humanities as a variety of the conflict between realism and idealism and shows how facts (as facts-of-a-case) as well as values (as ideals, or ends-in-view) are essential components of problem-solving; they only get separated when attempts are made to make a fact into something that exists independently from lived experience. However, when we understand truths as the products of problem-solving activities that are then applicable to other human problems, the fruits of inquiry from both science and the humanities can be mutually beneficial. This is especially so when we consider the differences between the subject matters of common sense, philosophy, and science. Common sense inquiries begin with practical affairs of everyday life; these inquiries become refined into literature and tradition as each seeks to pass down lessons of experience to the next generation, often but not always in a self-critical manner. Science begins with the same subject matter of ordinary affairs; it differs from the humanities in its concern for creating artificial and experimental situations through which specific variables can be isolated and controlled, and which transforms the natural phenomenon into a scientific phenomenon. In doing so, scientists establish new relations in the world which permit scientists and humans to interact with their environments in more stable and often novel ways. Ideally, the products of scientific inquiry feedback into our everyday commons-sense experience. Unfortunately, this feedback has not occurred to the degree that would be transformational to human social life. This lack of sufficient feedback and subsequently the impossibility of feeding forward into productive anticipation is at the heart of the conflict between the cultures of the sciences and of the humanities.

Dewey considered it a new task for philosophy to be a transformative and reconstructive power by navigating between the two cultures in such a way that their territories are not opposed or traversed with difficulty.

> Over-specialization and division of interests, occupations and goods create the need for a generalized medium of intercommunication, of mutual criticism through all-around translation from one separated region of experience into another. Thus philosophy as a critical organ becomes in effect a messenger, a liaison officer, making reciprocally intelligible voices speaking provincial tongues, and thereby enlarging as well as rectifying the meanings with which they are charged. (Dewey, 1925, p. 410)

[322] Practical note: In the handbook, the author's name is incorrectly referred to as 'Solymoski'.

Following up on Dewey's analysis and appeal, Solymosi presents the framework of *neuropragmatism* as a concrete step in the direction of this kind of reconstructing philosophy. *Neuropragmatism* does so by taking the results and the methods of science seriously as the means for achieving ideals, and, through reflective deliberation, both these ideals and facts are modified to fit the specific situation. In other words, "criticism of science by commonsense is just as valuable as science's criticism of commonsense for the end-in-view of viable growth in ameliorative experience" (Solymosi, 2011, p. 163).

10.1.3 Section-summary

Above, we navigated through the vast field of academic knowledge production and identified several research- and knowledge-cultures that each claim a piece of the cake of truth. From this exploration, it could be inferred that extra-disciplinary, academic fields diverge qua subject-matter and methodological approach, and that intra-*academically* integration and communication are an important point of concern; especially in terms of different research-cultures that strive for prominence, autonomy and dominance. A look at the scholarly attempts at re-conciliating these different cultures shows that a continuum of options is available ranging from claims to full territorial autonomy, to attempts that hierarchically and vertically reduce, integrate, and order the elements of scientific culture. It could also be noted that currently a discourse is being developed that holds a hybrid middle-position by promoting disciplinary autonomy (the hedgehog-attitude) while simultaneously looking for opportunities in terms of translation, bio-cultural cohabitation via the notion of embodied cognition, complementarity and eclecticism (the fox-mentality). It is a line of thought that builds on the framework of classical pragmatism and situates the 'jumping together' (*con-salire*) of information originating from distinct disciplines and research cultures with an approach to truthfulness that is determined and judged by the viability and the effect of entertaining a certain belief.

In the next section we will see if a line of thought can be identified within the field of music-related research that resonates with the tenets of a bio-cultural dialogue as it is represented in recent scholarship by Gould (2003/2011), Slingerland (2012) and Solymosi (2013).

10.2 Five consilient-friendly views on the relation between art, life and music

In its acquired and cherished state of autonomy and despite the attempts to objectify some of its technical and craft-oriented aspects, Western Art Music *in globo* has developed to a large degree into

a practice that produces internal goods according to its own standards of excellence[323] (see Wilson's critique on economics and sociology in 10.1.1). In doing so, the field surrounding Western Art Music draws mainly on an internal knowledge-base and an own history and tradition that serve as sources for reflection, interpretation, inspiration and experimental action. This solipsistic state of affairs is to an important extent related to a romantic view on music: if music provides direct access to a *noumenal* and metaphysical realm, why then should talented musicians care about the constraints and characteristics of a world of physical phenomena? In other words, if the musical work is the embodiment of a 'possible' world, why should musicians care and want to understand the 'real' world? This ideology of music's intangible and unmediated quality and the embodiment of it in the musical work, is indeed a major obstacle to connecting musical practice to a wider field of knowledge production. In an effort to understand music in terms of ecological psychology, psychologist Eric Clarke specifically refers to this incongruity when claiming that "as a cultural construction, the idea of autonomy continues to perform a powerful ideological role, both as a barrier and a dynamic force in the critical power of music" (Clarke, 2005, p. 205).

In this section, we explore alternatives to an autonomous epistemic state of music with a focus on orientations that resonate with the attempts in *academia* to come to a coherent and dialogical landscape of enquiry.

10.2.1 Art as experience

We already presented John Dewey in the previous chapters as one of the great thinkers of early American pragmatism, embodying the ambition to reconcile the dualisms between reason and emotion, thinking and doing, theory and practice, and fundamentally, between body and mind. Inspired by Darwin's theory of natural selection, Dewey advocates a naturalistic approach to human understanding, with a central place to our biological structures and functions where knowledge arises from an active adaptation of human organisms to their environments (Rylander, 2012, p. 15).

> The primary postulate of a naturalistic theory of logic is continuity of the lower (less complex) and the higher (more complex) activities and forms. The idea of continuity is not self-explanatory. But its meaning excludes complete rupture on one side and mere repetition of identities on the other; it precludes reduction of the "higher" to the "lower" just as it precludes complete breaks and gaps. The growth and development of any living organism from seed to maturity illustrates the meaning of continuity. (Dewey, 1938, p. 23)

[323] See musicologist Karol Berger in *A Theory of Art* for a discussion of music as a social practice with reference to the MacIntyre criteria: "By a 'practice' I am going to mean any coherent and complex form of socially established cooperative human activity through which goods internal to that form of activity are realized in the course of trying to achieve those standards of excellence which are appropriate to, and partially definitive of, that form of activity, with the result that human powers to achieve excellence, and human conceptions of the ends and goods involved, are systematically extended" (Berger, 2000, p. 111; MacIntyre, 2007, p. 187).

In *Art as Experience* (1934), Dewey presents a theory of art that exemplifies the idea of continuity and embeddedness by focussing no longer on the material 'work of art'[324] but rather on the artistic process and more in particular the development of 'an experience'. According to Dewey, the work of art is what the product cause in experience; however, when it is being separated from the original conditions in experience and remitted to a separate realm, it becomes almost opaque in its significance.

> [The task of philosophy of the fine arts] is to restore continuity between the refined and intensified forms of experience that are works of art and the everyday events, doings, and sufferings that are universally recognized to constitute experience.[…] In order to understand the meaning of artistic products, we have to forget them for a time, to turn aside from them and have recourse to the ordinary forces and conditions of experience that we do not usually regard as aesthetic. (Dewey, 1934/1980, pp. 3–4)

Dewey challenges the 'compartmental conception of fine art' (Dewey, 1934/1980, p. 8) which he relates to imperialism, nationalism, and capitalism and instead proposes to base aesthetic theory on the biological sensory exchange (interaction or transaction) between humans, whom Dewey calls 'the Live Creature', and environment.

Ultimately Dewey argues that the art of an artwork is not essentially in the art object but rather in the realisation of having 'an experience'. According to Dewey, normal experience, is full of "distraction and dispersion. What we observe and what we think, what we desire and what we get are at odds with each other" (Dewey, 1934, p. 35), but having 'an experience' is when material experience runs its course to fulfilment.

> Then and then only is it integrated within and demarcated in the general stream of experience from other experiences. A piece of work is finished in a way that is satisfactory; a problem receives its solution; a game is played through; a situation, whether that of eating […] Such an experience is a whole and carries with it its own individualizing quality and self-sufficiency. It is *an* experience. (Dewey, 1934, p. 35)

Art is thus related to a particular form of experience, resulting from a necessary relation between 'doing and undergoing': "to put one's hand in the fire that consumes it is not necessarily to have an experience. The action and its consequence must be joined in perception. This relationship is what gives meaning; to grasp it is the objective of all intelligence" (Dewey, 1934, p. 44).

In all the considerations that Dewey develops in relation to art production and reception the principle of continuity between higher forms of art and everyday experience is continuously employed and developed. It is a first and important step in enabling the use of a shared conceptual *vocabularium* between the fields of biology, culture and art production; it constitutes in very general terms a

[324] Dewey still recognizes the individual art object as a site for the dialectical processes of experience, as the locus where the artist and the active observer encounter each other, their material and mental environments, and their culture at large.

'common ground' for artistic knowledge and other fields of expertise to meet in informational dialogue.

10.2.2 Art in terms of biologically guided, cultural archetypes

In *Consilienc*e (see 10.1.2.2), Wilson explores the relation between biology, culture and art and devotes a chapter, entitled 'on the arts and their interpretation', to the potential of consilient explanation in relation to the creative arts (Wilson, 1998, pp. 229–259). Wilson presents his enterprise as an alternative to postmodernist approaches which, in his view, lack a compass based on sound material knowledge. According to Wilson, it is only by sharing expertise in a consilient way that progress can be made in understanding the arts:

> If the brain is ever to be charted, and an enduring theory of the arts created as part of the enterprise, it will be by stepwise and consilient contributions from the brain sciences, psychology, and evolutionary biology. And if during this process the creative mind is to be understood, it will need collaboration between scientists and humanities scholars. (Wilson, 1998, p. 236)

Wilson's point of departure is similar to Dewey's – although no reference to Dewey is present in the book : "the arts, like the sciences, start in the real world and then reach out to all possible worlds, and finally to all conceivable worlds" (Wilson, 1998, p. 240). Grounded in the 'real' world, Wilson proposes a three-part formula for something to become art: 1/ imitate something; 2/ give it form (geo-metrical); and 3/ intensify its features. By these three extremely reduced elements, art expresses the human condition by mood and feeling, calling into play all the senses, evoking both order and disorder.

According to Wilson, what the masters of the Western canon and those of other high cultures share is their intuitive grasp of inborn human nature, accurate enough to select commanding images from the mostly inferior thoughts that stream through the minds of all of us. These extraordinary artists select images from nature that are most emotionally and aesthetically potent. They achieve that by intuition, and with a sensibility that does not submit easily to formulas. However, while free-ranging in the selected details, artists generally remain faithful to the innate universals of aesthetics. Even when, as part of fantasy, they imagine worlds that cannot possibly exist, they still stay anchored to their human origins. Wilson postulates three evolutionary contexts in which the arts could have evolved.

Firstly, as a remedy against the solipsism of the self-conscious mind (see Mithen in Chapter 3):

> The most distinctive qualities of the human species are extremely high intelligence, language, culture, and reliance on long term social contracts. In combination they gave early Homo sapiens a decisive edge over all competing animal species, but they also exacted a price we continue to pay, composed of the shocking recognition of the self, of the finiteness of personal existence, and of the chaos of the environment. (Wilson, 1998, p. 245)

According to Wilson, *Homo Sapiens* is the only species to suffer this kind of psychological exile and he considers culture and the arts as a necessary technology to overcome this element of deficit.

A second evolutionary reason for the arts to develop is the way in which they order an overwhelming world. All animals, while capable of some degree of specialized learning, are instinct driven, guided by simple cues from the environment that trigger complex behaviour patterns. The situational context that prompted the arts was the need to impose order on the confusion caused by intelligence. Because of the slowness of natural selection, which requires tens or hundreds of generations to substitute new genes for old, there was not enough time for human heredity to cope with the vastness of new contingent possibilities revealed by high intelligence. Algorithms could be built, but they were not numerous and precise enough to respond automatically and optimally to every possible event. The arts filled the gap. Early humans invented them in an attempt "to express and control through magic the abundance of the environment, the power of solidarity, and other forces in their lives that mattered most to survival and reproduction" (Wilson, 1998, p. 246).

Finally, and next to countering solipsism and creating order and meaning from the seeming chaos of daily existence, the arts also nourish our craving for the mystical originating out of the subconscious and out of our dreams of the unattainably distant places and times. Wilson considers the human attraction to mystery as "something still too amorphous, too poorly understood to be broken down into puzzles" (Wilson, 1998, p. 254). The fact that our minds travel so easily and eagerly from the familiar and tangible to the mystic realm, even in times of global information networks, indicates that the human spirit is drawn toward the unknown, that what has yet to be uncovered.

Given this evolutionary background, what can we know about the creative powers of the human mind itself? According to Wilson, the explanation of the material basis of the arts can only be found at the juncture of the sciences and the humanities. The primary premise is always that *Homo Sapiens* is a biological species born of natural selection in a biologically rich environment and the corollary attached to that premise is that the epigenetic rules affecting the human brain were shaped during genetic evolution by the needs of Palaeolithic people in their environment. The premise and corollary have consequences for conceptualizing culture:

> Culture, rising from the productions of many minds that interlace and reinforce one another over many generations, expands like a growing organism into a universe of seemingly infinite possibility. But not all directions are equally likely. […] The epigenetic rules of human nature bias innovation, learning, and choice. They are gravitational centres that pull the development of mind in certain directions and away from others. Arriving at the centres, artists, composers, and writers over the centuries have built archetypes, the themes most predictably expressed in original works of art. Although recognizable through their repeated occurrence, archetypes cannot be easily defined by a simple combination of generic traits. They are better understood with examples, collected into group that share the same prominent features. (Wilson, 1998, p. 243)

Given the impossibility of explaining works of art by identifying generic traits, interpretation of examples is indispensable and it is here that a consilience between science and the arts can flourish. According to Wilson, interpretation will be the more powerful when woven together from history, biography, personal confession, and science. However, the key to the exchange between them is not hybridization, not "some unpleasantly self-conscious form of scientific art or artistic science", but rather "reinvigoration of interpretation with the knowledge of science and its proprietary sense of the future" (Wilson, 1998, p. 230). Gene-culture co-evolution is in Wilson's framework the underlying process by which the brain evolved and the arts originated and which is most consistent with the joint findings of the brain sciences, psychology, and evolutionary biology.

Explaining the arts is one thing, the creative production is another and in Wilson's view creation can never be locked in by any discipline of science. The reason is that:

> The exclusive role of the arts is the transmission of the intricate details of human experience by artifice to intensify aesthetic and emotional response. Worlds of art communicate feeling directly from mind to mind, with no intent to explain why the impact occurs. In this defining quality, the arts are the antithesis of science. (Wilson, 1998, p. 238)

Notwithstanding their origin in the imagination of individuals, the production of art nevertheless and necessarily touches upon what is universally endowed by human evolution. Even the greatest works of art are indebted to the biologically evolved epigenetic rules that guide them: certain thoughts and behaviour are more effective than others in the emotional responses they cause and the frequency with which they intrude on phantasy and creative thought; via this biasing mechanism a cultural evolution is initiated toward the invention of archetypes, the widely recurring abstractions and core narratives that are dominant themes in the arts. The archetypes are the source from which the metaphors flow that are present in the arts but also of ordinary communication; they are the building blocks of creative thought.

Wilson's conclusion: the arts are innately focused toward these archetypical forms and themes but are otherwise freely constructed. However, he explicitly adds: "the biological origin of the arts is a working hypothesis, dependent on the reality of the epigenetic rules and the archetypes they generate. It has been constructed in the spirit of the natural sciences, and as such is meant to be testable, vulnerable, and consilient with the rest of biology" (Wilson, 1998, p. 249).

10.2.3 Music as biocultural phenomenon

A third consilient-friendly approach is presented in a series of articles and book chapters by Cambridge University Professor of Music & Science Ian Cross where he develops a framework for understanding

music in bio-cultural terms (Cross, 2003a, 2003b, 2006). Cross is critically aware of the two ways in which music can be approached: on the one hand music can be considered from its knowable relationship to human biology, mind, and behaviour; on the other hand, music exists also in its diversity as *musics*, which are multiple and unknowable within a single unitary framework. In the latter view music seems to have lost much of its materiality grounded in human behaviour, it can only be approached through culturally situated acts of interpretation that unveil a multiplicity of musical ontologies, some or most of which may be mutually irreconcilable (Cross, 2003a, pp. 19–20).

In his contributions, Cross argues for the first option, the materialist perspective: *musics* are grounded in human behaviours, minds, embodied human brains, human biology, and ultimate in the processes of evolution. *Musics* are from that perspective culturally situated, minded human behaviours that stand in a structural relationship to human evolution. Of course, it might be the case that the cultural dynamics of music are distantly removed from the evolutionary processes that underlie human biology, but a clean and definitive dissociation between culture and biology – or between music and evolution – is, according to Cross, intellectually not defendable. Cross does not argue that *musics* are wholly reducible to an understanding of evolution, merely that the relation between *musics* and evolution is an element in need of exploration and specification. He sees evolution as "impacting on human mind and behaviour not by shaping or determining complex behaviours directly but by providing general constraints on how minds interact with their environments" (Cross, 2003a, p. 21); within this context "culture shapes and particularizes proto-musical behaviours and propensities into specific forms for specific functions, and those, can be so divergent that they do not appear to be mutually reducible" (Cross, 2006, p. 33). An exploration into the evolutionary origins of music then relates to the attributes that allow a gene, a behaviour, an organism, or a specific intra- or intergroup dynamic to be successful in survival and reproduction.

As a point of departure to find these general attributes, Cross considers four elements of which the embodied nature of music or the indivisibility of movement and sound, is a primary one (Cross, 2003a, p. 23). When looking and listening to *musics* beyond the boundaries of contemporary Western culture, one can observe that music always involves action; "to explore perception and cognition requires a reformulation of the dimensions of music and musicality, a re-definition of music in terms of both sound and movement and of the relationships between them" (Cross, 2003b, p. 107). A second, general to music seems to be that it always hold a social and interactive dimension, it connects people and can be seen as a mechanism for restructuring or strengthening social relation: "it appears that the human experience of music is most adequately conceived of as having a social and interactive dimension, (Cross, 2003b, p. 107). A third element in the spectrum of universal attributes is that music involves multiplicity of reference and meaning: a piece or performance is simultaneously capable of bearing many different meanings. Music is not only sonic, embodied and interactive, it is bound to its

contexts of occurrence in ways that enable it to derive meaning from, and interactively to confer meaning on, the experiential contexts in which it occurs, these meanings being variable and transposable (Cross, 2003b, p. 108). This heterogeneity of meaning can be observed when a member of one culture receives and interprets music from other cultures, but the phenomenon is also intra-culturally present. The meaning of a musical activity will necessarily depend at any given moment on that person's own history and narratives, and on the situational significances that culture's "shared system of meanings" confer on that activity. Music and protomusical activity exhibit thus a "transposable aboutness" (Cross, 2006, p. 33), a polysemic potential that underpins the social functionality of music and contributes, but not determines, music's meaning (Cross, 2006, p. 39). A final feature identified by Cross, is that music appears to have no obvious and direct survival value, no immediate and specifiable physical efficacy. Music can neither provide sustenance nor kill enemies, nor can it enjoin others—explicitly and unambiguously—to do so.

From these four attributes Cross infers that *musics* can be defined as "those temporally patterned human activities, individual and social, that involve the production and perception of sound and have no evident and immediate efficacy or fixed consensual reference" (Cross, 2006, p. 33). Taking into account the 'transposable aboutness' and the 'cognitive flexibility' that marks off humans from all other species, also a second working-definition is proposed: "*musics* are cultural particularizations of the human capacity to form multiply-intentional representations through integrating information across different functional domains of temporally extended or sequenced human experience and behaviour, generally expressed in sound" (Cross, 2006, p. 38).

Having identified these attributes, the question remains how they can be linked to an evolutionary perspective. Here, Cross takes recourse to infant predispostitions which prime children to deal with certain types of information rapidly and expertly without being taught to do so (Cross, 2003a, p. 25). Children have a sort of intuitive biology, physics, and psychology at their disposal and Cross refers to early work by developmental psychologist Sandra Trehub and collaborators where it is demonstrated that six months infants are "rather capable listeners" and sensitive to melodic contoural constancy even though the pitches might have changed (Trehub, Schellenberg, & Hill, 1997). Another point in case is the pioneering work of developmental psychologist Mechthild Papoušek (1996) which shows that infants display a range of 'proto-musical behaviours' in their interactions with their caregivers, using rhythm and pitch in a musical way. A third piece of evidence brought forward by Cross is developmental psychologist Colwyn Trevarthen's work on infant-caregiver interactions (Trevarthen, 1999) which indicate the early presence of musicality by the development of 'primary intersubjectivity' and the sharing of emotional states between caregiver and child[325]. Finally, Cross refers to his own

[325] "Research on the dynamics of proto-conversations and musical games with infants elucidates the rhythmic

research and that of Steven Mithen's (Mithen, 1996) to suggest that proto-musical activities provide a mechanism for consequence-free exploration in acquiring cognitive flexibility as well as competence in social interaction. Proto-musical behaviours help in the integration of early-developing competences in discrete domains of cognition and behaviour. Thus it seems likely that "the emergence of proto-musical behaviours and their cultural actualization as music were crucial in precipitating the emergence of the cognitive and social flexibility that marks the appearance of Homo sapiens sapiens" (Cross, 2003a, p. 28).

In summary, the bio-cultural research-perspective that Cross advocates aims at explaining musical behaviour by figuring out the essential proto-musical behaviours or predispositions and to relate them to the cultural particularisers that lead to a concrete artistic manifestation.

10.2.4 Nature & nurture in musical sense-making

The relation between biology and culture is discussed by musicologist Mark Reybrouck in terms of a nature-nurture dependency rather than a dichotomy between the terms:

> Listeners, in fact, are biological organisms, which are immersed in a culture. But even culture did not evolve in a vacuum. Both culture and music are born out of man's 'animal characteristics', which are rooted in the biology of perception and cognition, and this may be universal to a great extent. (Reybrouck, 2008, p. 403).

Reybrouck takes the commonalities at the level of acquired habits and learned responses as a basis for a conception of universals in music that underpin cultural variation and subjectivity. He thereby carefully steers between biological determinism, historical forces and cultural traditions by proposing a biocultural view that strikes a balance between genetic or biological constraints on the one hand – though there is no absolute agreement on what they are – and historical and cultural contingencies on the other.

As a central issue in thinking about the relation between nature and nurture, Reybrouck brings up the following question:

> Is musical sense-making coded in our genetic programmes with reactions which rely on pre-wired and innate programmes or should we conceive of music as something which calls forth higher functions of the brain? And can we conceive of musical sense-making in terms of a dichotomy (innate/acquired) or should we think in terms of complementarity between distinct levels of processing? (Reybrouck, 2008, p. 399)

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and prosodic foundations of sympathetic engagement in expressive exchanges. Developments in the first year prove the importance of the impulses of natural musicality in the emergence of cooperative awareness, and show how shared participation in the expressive phrases and emotional transformations of vocal games can facilitate not only imitation of speech but interest in all shared meanings or conventional uses of objects and actions" (Trevarthen, 1999, p. 155).

The genetically programmed codes and hard-wired responses are typically fast and efficient but at the same time also very much restricted in their scope and functions.[326] The number of primitive responses cannot increase indefinitely, thus animals became more and more dependent on processes of learning in order to increase their behavioural repertoire.

According to Reybrouck, musical sense-making, accordingly, is based on a dispositional machinery which is coded in our genetic programs and shaped by previous and current interactions with the sonic world (Reybrouck, 2008, p. 420). He follows Wilson in maintaining that it makes sense to conceive of biological, perceptual, and ecological constraints which act as 'biases', rather than to think in terms of 'causal relationships' between sounding stimuli and reactions to these stimuli.

> It allows us, further, to consider the idiosyncrasies of the individual music user in his/her attempts to make sense out of the sounding flux, and to conceive of the process of sense-making in terms of epistemic autonomy. As such, there should be a dynamic tension between the 'nature' and the 'nurture' side of music processing, stressing the role of the musical 'experience proper'. (Reybrouck, 2008, p. 421)

In the same context of an interaction between nature and culture, musicologist Marc Leman takes natural and cultural constraints as a point of departure for a dialectal conversation. Natural constraints are the subject domain of the natural sciences which aim at describing and modelling the relationships between material entities; cultural constraints, on the other hand are about "the control of significations, attribution of meanings through habit or convention, ideals, norms, values, and worldviews" (Leman, 2008, pp. 55–56). Leman admits that cultural phenomena can often not be fully explained on the basis of a few natural constraints alone which necessitated the reintroduction of a socio-cultural level.

> We cannot fully understand the impact of cultural constraints on the basis of cultural explanations alone, nor can we fully understand the impact of cultural constraints on the basis of natural explanations alone. It seems that both cultural and natural constraints are needed to understand musical phenomena. Certain phenomena are grounded in natural constraints but manifest themselves as goals or values. Thus, they have the status of cultural constraints and can exert strong influence on the development of new cultural phenomena. To understand this global resonance between natural and cultural constraints, it is strategically wise to have a look at what physics and biology can offer, and then reconsider the cultural explanation from that perspective. (Leman, 2008, p. 62)

[326] For a biological grounding of these intuitions, reference could be made to dual process theories in psychology. They differentiate between fast, implicit, associative and intuitive processes, and explicit, controlled, verbalized, and conscious processing in human functioning (Kahneman, 2011).

10.2.5 The role of origins in negotiating between sciences, literature and humanities

A final example of an attempt to reconcile the sciences, arts and humanities is situated within the context of *the European Thematic Network devoted to Interfacing Sciences, Literature and Humanities* (Spinozzi & Zironi, 2010), the concept of 'origins' is aproposed as the perfectly suited tool to host interdisciplinary dialogue.

> If humanistic and scientific disciplines agree to explore trans-disciplinary routes, long-established definitions of art can be re-framed and, more specifically, innovative hypotheses about the origin of artistic expression can be developed. Furthermore, becoming acquainted with scientific approaches to the origins of art engenders a metacritical process, which prompts humanities scholars to ask themselves how their specific research methods can gain greater efficacy. (Spinozzi, 2010, p. 59)

Humanistic-scientific views on non-Western art have the potential to respond by complementing, rather than replacing, historically and philosophically oriented conceptions. Origins have been eluded by humanities scholars and getting acquainted with these neglected areas can potentially lead to the construction of a new cartography of the arts base on an understanding of art as an intrinsic, and shared, rather than a privileged, almost exclusive, human expression.

10.2.6 Section-summary

Taking our exploration into *academia* as a point of departure, we identified within the field of music research a line of thought (starting with Dewey) that resonates well with the tenets of bio-cultural consilience. It concerns a perspective to music that challenges a tradition in which art music is considered as an autonomous practice which is primarily concerned with producing musical works and is focused on idiosyncratic expression and creativity, or relegates music to the ineffable domain of metaphysics. Instead, biocultural approaches to music are considering music as a behaviour guided by a combination of phylogenetic predispositions, cultural particularisations, and personal choices. By shifting attention to music as action and interaction, the field of art music is no longer sealed off from the life-world (and thus from extra-disciplinary terrains) but becomes an integral part of it.

Within the context of these bio-cultural ways of thinking about art in general, and music in particular, there is a keen awareness of potential benefits and restrictions: strictly scientific or biological approaches will not be able to provide a complete picture of musical variability, given the inherent cultural situatedness of art; art studies in the humanities can benefit from setting up a dialogue with a bench-marking framework that is able to challenge tradition and idiosyncrasies and leads to new forms of criticism and hermeneutics.

10.3 A Bio-Culturally informed Performers' Practice [BCiPP]

The investigation above was needed to familiarise ourselves in a structural way with extra-disciplinary terrains and to see if a common ground for an informational encounter with musical practice could be identified. The crucial difference between intra-scholarly debates on integration and cooperation and our project of finding common ground between artistic practice and *academia* is that the priorities of artists are not primarily in explanations, understandings or finding general or particular truths in the traditional sense. Practitioners develop ideas primarily in function of action, directly or indirectly, and the information originating from extra-disciplinary domains is used to pragmatically review, challenge, inspire and invigorate personal theory.

This particular context takes us back to the drawing board that we set up in the previous chapter in relation to the role of theory in practical inquiry. Until now, we have referred to information that does originate in fields of knowledge other than musical practice itself as 'extra-disciplinary information' and employed the working-term 'Generally Informed Performer' or 'Generally Informed Performers' Practice' to refer to a performership that stands in an active and systematic relationship to these fields. Given the navigational explorations presented in this chapter, we are now able to be more punctual and systemic about this vast field of information and pass on to a more systematic and delineated approach. If our ambition is to extend a performer's information-base into more inclusive directions that go beyond historical and philosophical sources, then we could refer to such a perspective as a *Bio-Culturally informed Performers' Practice*. What are the essential element of such a performership?

We already discussed various epistemic categories that are of influence to a concrete practice situation: 'personal theory' (or '*Image*') relates to the 'beliefs' and 'habitus' of a performer and usually develops against the background of a shared 'performers practice' and its 'traditions'; 'experience', 'reflection' and 'learning' are potentially linked to (challenging) practice situations that normally build on 'habits', 'experimentation', 'imagination', and 'creativity' and are potentially informed by metatheory in a process of 'inquiry' (see Fig. 10.1). By introducing bio-cultural thinking in our scheme, the domain of metatheory can be more punctually indicated as the field of bio-cultural information. 'Bio' implies then information concerning systemic and generic elements about human functioning and is from an ecological perspective extendable to include the physical environment which stands in an inter- or transactional relation to that functioning. The notion 'cultural' relates to the particularised ways in which biologically pre-disposed humans configure life and society in diverse historical, regional, practical and personal contexts. The hyphen that connects leaves the possibility for a continuum of possible relations between the two fields and counters hierarchical interpretations.

To harmonize our model on the practice-side of things and make it resonant with a bio-cultural perspective and awareness, we should add a biological factor there[327]; if 'predispositions' are added as biological elements of a practice situation and the term 'disposition' is used as a complementary term in the field of personal theory, then our model covers for most of the concerns that we already raised.

What is still missing however is the relation of musical practice to extra-disciplinary domains other than scholarly fields of knowledge production. By that, reference is made to fields such as body-techniques (Feldenkrais, Alexander technique) and also to other artistic and non-artistic practices that do not directly adhere to a scholarly milieu (visual arts, professional practices, etc.). If we hold on to the mechanism of information as the connecting element this should not pose major obstacle to our bio-culturally informed project. These practices are cultural and produce information as disembodied knowledge which is accessible via a range of media.

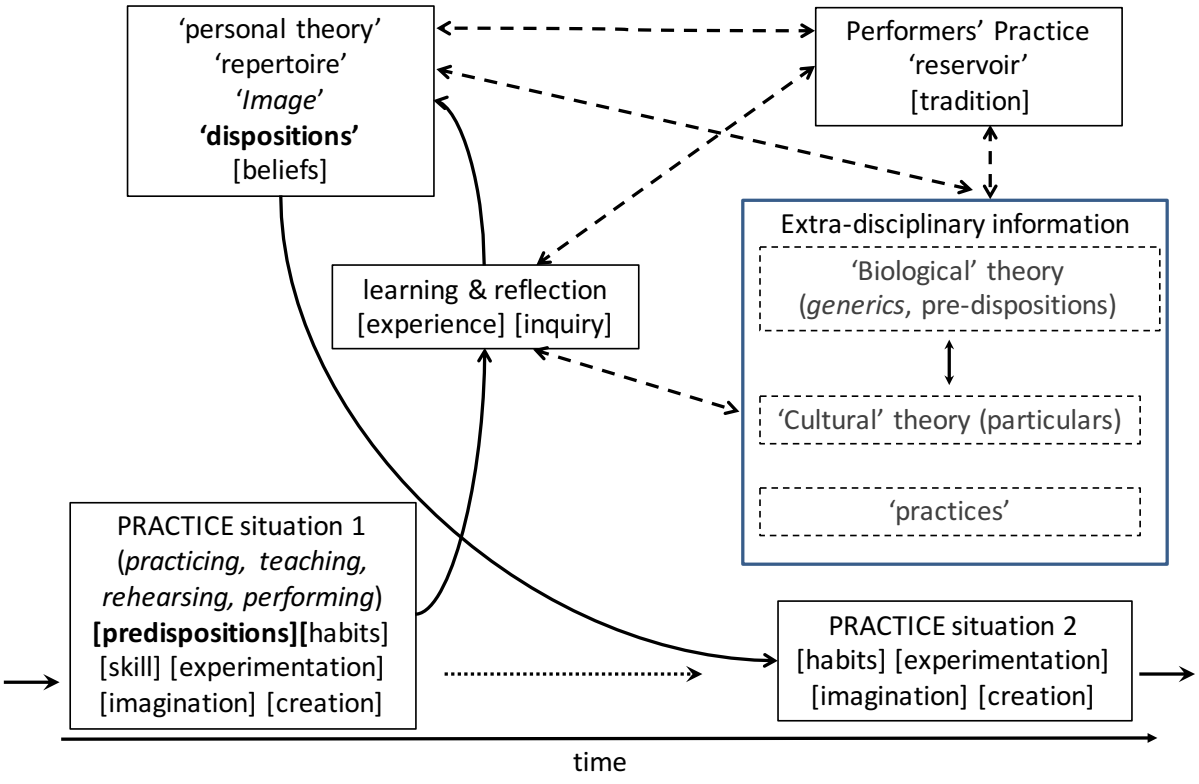

Figure 10.1. A bio-culturally informed action cycle.

The cycle of bio-culturally informed performership as presented in Fig. 10.1 takes off with a practice situation that is broadly defined and not limited to staged performances, it concerns a variety of concrete activities, of doings and sayings (such as practicing, thinking, teaching, rehearsing, reading,

[327] It becomes apparent now that the learning-model that we developed in the previous chapter was humanities-laden with almost no reference to biological factors.

listening) and is grounded in more formal categories including predispositions (biological inclinations both on a generic and personal level), acquired habits and skills, experimentation, imagination, creation (as the actualisation of imagination).

These practice-driven actions continue (dotted line) until a situation is encountered where normal experience is disturbed, doubts are raised or hands-on experimentation does not lead to a solution. The practitioner is now involved in a process of learning, reflection and inquiry. This stage can develop in different forms: the experience itself can immediately affect personal theory (learning); reflection can be very punctual and brief, and lead to new insights (reflection-in-action); reflection can be directed to the action and lead to an explicit delineation and objectivation of the problem. In the latter case a process of information sets in (dashed lines); information can originate from the guild of peers, teachers, colleagues (performers' practice), from other practices (visual arts, professional practices, body techniques), or from extra-disciplinary terrains that provide information on the generic aspects and/or the cultural aspects (historical, other cultures) of a question. The information 'jumps together' and is pragmatically assessed and judged[328] before it becomes part of a renewed personal theory or belief.

What we propose here is a new variant of consilience. Whewell saw consilience as the jumping together of apparently disparate facts lead to a coherent explanation and a higher form of understanding. Wilson extended the model to the relation between the sciences and the humanities, always with the intent 'to explain' things. What is put forward and introduced by this action-cycle is consilience between the science of phenomena (biology), their interpretations and situated manifestations (culture) and artistic practice (the sayings and doings of musicians). This type of consilience is not directed at 'explanation' but at invigorating and freeing the personal theories and beliefs that serve as background for artistic behaviour.

The informational model is a way out of a self-referential system governed by idiosyncratic sets of rules. A *Bio-Culturally Informed Performers' Practice* as a specification of an informed performership does not solve all the problems and challenges internally but rather acknowledges that it can learn from the experiences and inquiries of fellow-humans who look at things from a different perspective based different images of the world.

[328] "Judgment may be identified as the settled outcome of inquiry. It is concerned with the concluding objects that emerge from inquiry in their status of being conclusive. Judgment in this sense is distinguished from propositions. The content of the latter is inter-mediate and representative and is carried by symbols; while judgment, as finally made, has direct existential import" (Dewey, 1938, p. 120).

A Bio-Culturally informed Performers' Practice [BCiPP][329] is an interconnected array of activities and understandings within the broader category of score-based performership that is underpinned by a shared and active interest in information on generics and particulars in musical action and interaction as a factor in creating a sonic environment from which musical experiences can evolve.

Definition 7: Bio-Culturally informed Performers' Practice [BCiPP].

[329] When referring to the concept or when using the acronym, the 'i' of informed is not capitalized to symbolize its mediating role.