

## CHAPTER 9

**Art and music research<sup>1</sup>**

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In taxonomies of Western knowledge, ‘art’ and ‘music’ are grouped conventionally within a cluster of disciplines labeled ‘humanities’. Research on art and music, however, encompasses a wider array of disciplines and interdisciplinary fields. Music research also spans natural sciences (e.g. acoustics, physiology), formal sciences (mathematics, computing), and social sciences (psychology, sociology). Likewise, art research draws on the concepts, theories, and methodologies of social sciences as well as science and technology. Moreover, in both cases research spans not only historical studies of aesthetic forms and movements but also the nature of creativity, the physiology and cognition of perception, the reception of aesthetic works within particular groups and cultures, and the institutional formations of research and education. While much has been written about the universality of art and music across cultures and in general theories of the arts, the disciplines are constructed differently. In the Anglo-American academy, for example, ‘art history’ became an umbrella label for research centered initially on the history of Western art but later including other disciplines and art forms. In European practice ‘musicology’ (*Musikwissenschaft*) is often thought to include both humanities and sciences, whereas in North America it was more confined traditionally to humanities.

Like all collaborators who cross knowledge boundaries to work on a common project, the co-authors of this comparative reflection grappled with differences shaped by their academic and cultural backgrounds. One, a professor of humanities, was trained in literary studies in North America, then her research and teaching interests broadened to include interdisciplinary humanities, American cultural studies, and the theory and practice of interdisciplinarity. The other studied music, physics, and psychology in Australia, then conducted research at the interface of music psychology, music theory, and music performance, and as a professor in Austria developed new infrastructures to encourage musicological interdisciplinarity. Even such basic terms as ‘humanities’ and ‘science’ became boundary objects

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in our conversation. The term ‘art’ was also an intersection for negotiating meaning. It has referred traditionally to a large family of visual and performing arts, including not only visual and plastic arts of painting and sculpture but also music and theater. For the sake of comparison, and heeding separations in major taxonomies and divisions of scholarship, in this chapter the singular form of the term ‘art’ designates visual and plastic forms, and the plural form ‘arts’ refers to a more general compass inclusive of both art and music.

The disciplines of art and music have several elements in common that make for a compelling comparison. They both inherited an identity vested in creativity and traditional values of the liberal arts that were transmitted through European tradition to the American colonial college, then challenged and reinvigorated in new critical approaches to scholarship and teaching. They both enjoy a presence beyond the academy in performance venues, museums, other cultural institutions, and electronic media. They are both non-verbal media whose data are more resistant to verbal explication than the data of other disciplines classified as humanities (Parker 1997). And, over the course of the twentieth century, they underwent parallel changes. Their canons expanded, new scholarly approaches fostered new understandings, and the objects of research were profoundly changed by technological developments.

This chapter explores the interdisciplinary nature of the two disciplines, with particular attention to patterns of origin, new practices, and (re)constructions of disciplinarity and interdisciplinarity. Throughout the discussion, we also consider the place of art and music in the larger relationship of humanities and science and technology.

## 9.1 Origins

Research on both art and music has a long history. Giorgio Vasari’s evolutionary approach to style history influenced the general outlines of historical studies of art for several centuries. In *Lives of the most eminent painters, sculptors, and architects* (1550), Vasari extolled the European High Renaissance as the pinnacle of excellence. His methodology was a series of aesthetic and moral value judgments interwoven with anecdotes and references to purported facts (Kraft 1989). Barbara Stafford (1988) traces the formal origin of art history to the eighteenth century. Art history was a borrower from the start, taking attitudes and vocabularies from prior or canonical disciplines and constructing a hybrid identity from mathematics, rhetoric and poetics, and philosophy. Its founders were mindful of an intellectual deficit. Artists were inclined to offer inductive and artisanal conjectures about visual and aesthetic matters, not deductive or exact knowledge about a fixed or stable mental territory with objects of intellection. The formation of the modern disciplines during the late nineteenth and early twentieth centuries had a dramatic impact on both art and music research, shaped by the cumulative forces of professionalization, specialization, and a growing scientification of knowledge.

The attempt to orient humanities toward a new positivist paradigm began in the early nineteenth century, initially in Germany and in linguistics. The dominant model was a form of grammatical study that differed from the normative and philosophical approach of the eighteenth century. Imbued with new empirical values of scholarship, James Stone

(1969) recalled, discovery became the primary purpose of research by professionalized experts. The tendency towards painstaking investigation and minute methodology became as evident in historiography as in the sciences. For the humanities scholar, the equivalent of the laboratory was analytic abstraction, reinforced by description, classification, comparison, and compilation. Like laboratory specimens, humanities objects could be manipulated, dissected, and embalmed; measured, counted, and calibrated; and subjected to precise methodologies. A credo, a comedy, a portrait, an idea, or a hero could be subdivided by analysis and abstraction into the propositions of philosophers, the techniques of literary and art historians, and the events of historians. As scholars in growing numbers embraced ideals of objectivity, precision, and specialization, the notion of a shared culture diminished. Decentralization and fragmentation of education hastened. Older unified fields of inquiry and principles of the university eroded, and new unifying hypotheses were foreshortened. The positivist paradigm that took root in the modern discipline of art history, Kraft notes, accentuated empirically grounded facts, historicism, and style analysis defined by formal characteristics such as color, shape, line, texture, and space. Works, artists, styles, and national or ethnic groups could be compared and classified, explicated, and interpreted in a systematic fashion. In addition, art historical research could be separated from other fields, interpretations legitimized with truths parallel to scientific laws, and the contextual dynamics of production and reception placed beyond positivist science.

Pulling in the contrary direction, the most powerful early basis for interdisciplinary relationships among the arts, including music, was periodization and interart comparison. Common motifs, themes, and genres suggested synchronic relations within chronological eras (e.g. medieval, romantic) and stylistic categories (e.g. classical, mannerist). During the nineteenth century, interart comparison was typically formulated in terms of historical criteria, such as a *Zeitgeist* or a *Formwille*. The theory of Goethian or romantic organicism also treated ‘arts’ in the general sense, as a holistic entity and, in the twentieth century, E. H. Gombrich’s concept of norms and theories of social reflexes and technical achievement provided a basis for unity. The discourse of unity centered on the spirit of movements, periods, or moments thought to convey coherence among all cultural activities and a complete parallelism of arts (Fowler 1972; Steiner 1982). Synoptic theorizing and the generalist tradition of humanities fostered different kinds of connection. Albert William Levi, for example, proposed that music involves a ‘radiating theory’ of overlapping value-concerns in arts and humanities, and the generalist tradition furnished a holistic model of moral, social, and religious development that aligned cultivation of taste in music with cultural literacy and moral character (Levy and Tischler 1990; Sibbald 1992).

The relationship between the sciences and the arts changed over time, though it has been dominated by two views. One, Sheldon Richmond (1984) recounted, treats them as polar opposites, the other as different expressions of a single voice. Richmond disputes both views, arguing that they are based on a false dichotomy that posits rationality (cognitivity) as the realm of science and irrationality (imagination) as the realm of arts. This dichotomy, though, minimizes correspondences over time. The period of the Renaissance, for instance, saw revolutions in both arts and sciences that turned on the same point—the discovery of linear perspective and the development of optics, allowing three-dimensional

interpretation of images whether they appeared in a painting or through the lenses of a telescope. Older hierarchies were also displaced. Aristotelian cosmology and Platonic ideals were initially supplanted by a non-perspectival ordering of objects on a canvas. Later, the Einsteinian revolution overturned Galilean–Newtonian space and time and the Impressionist–Cubist revolution recognized the plurality of visual fields and other kinds of spatial representation. Developments in science and technology have contributed to art research in diverse ways. On the one hand they have provided new subjects for the arts. In the case of music, the noises and rhythms of factories, production lines, and other aspects of modern life inspired and enabled new genres from *musique concrète* to punk rock. On the other hand, they have offered new means of asking research questions about all of the arts—such as how art and music are physically represented, perceived, and cognitively processed. Art history and music have increasingly interacted with scientific disciplines such as physics, physiology, psychology, and information sciences.

Defined broadly as ‘the study of music’, musicology includes all research about all music. Like art history, music was a borrower from the start. Before about 1600, most music research corresponded to the late nineteenth-century concept of ‘systematic musicology’. Ancient and medieval musical thought was dominated by precursors of modern sciences such as mathematics, acoustics, physiology, and psychology. In medieval universities, the liberal arts were organized into a *trivium* of grammar, logic, and rhetoric, and a *quadrivium* of arithmetic, geometry, music, and astronomy; early music research involved mathematical analysis of intervals and string length ratios in the Pythagorean tradition. ‘Systematic’ understanding of music improved gradually with the scientific revolution in the seventeenth century, the Enlightenment in the eighteenth century, the rise of the modern university in the nineteenth century, and the rise of computer technology in the twentieth century.

Just as art history became a dominant practice in art research, in the nineteenth century historical musicology dominated music research. Historical musicology depended on art history for the paradigm of style history and on literary studies for paleographic and philological principles (Treitler 1995). Since then, musicology has been institutionally grouped in the humanities, in spite of the important role of sciences throughout the history of musical thought.

The bias towards Western cultural elites in musicology has various origins. First, despite the long chronicle of musical thought musicology did not enter the academic canon until the nineteenth century—soon after the word ‘musicology’ was coined—so that Western culture and identity could be documented. Second, the humanities were academically central during the nineteenth century, and history has always been central to the humanities. Third, the music of Western cultural elites (also misleadingly, tautologically, or discriminatingly referred to as *classical music*, *art music*, or *high culture*) was regarded in the nineteenth century as intrinsically superior. In the language of alterity research (Taussig 1993), music that was not Western and elitist was (and often still is) considered to be Other music and thereby classified outside the taxonomy of sanctioned forms; Real music (or just ‘music’) was composed by Bach, Beethoven, Brahms, and other white males, and mimetically reflected European identity and superiority. The Eurocentric worldview of nineteenth-century humanities lives on today in conservative academe (cf. Cook 1998);

most societies, conferences, and journals of ‘musicology’ still focus on the history of Western cultural elites, and Western music is still the main focus of other musicological subdisciplines such as music psychology, in which research on expressive performance focuses on Chopin and Mozart.

## 9.2 New art histories and new musicologies

By the mid twentieth century, the positivist paradigm was still prioritized in humanities scholarship. During the 1980s and 1990s, though, talk of ‘new art history’ and ‘new musicology’ signaled the growing impact of expanding canons and scholarly practices. Donald Preziosi (1989) likens modern art history to an Ames Room or a Foucauldian heterotropic space of contradictory practices and theoretical positions. New stylistic movements such as pure form, color field painting, and minimal art had little in common visually with earlier traditions. The notion of art, Selma Kraft (1989) adds, expanded to include the works of women and different cultural groups. The boundary between high and low or popular art eroded, legitimating once-excluded objects such as popular, traditional, and folk music, furniture and quilts, cartoons and graffiti, commercial illustrations and tattooing. The repertoire of works of both art and music expanded on a global scale and large exhibits on Chinese painting and excavations, African art, and the art of the Mamluks and the Mughals. New hybrid genres also emerged. Performance art, for instance, combines music, visual art, literary expression, and theatrical performance and multigenre forms emanated from cultural movements for identity and equality.

Scholarship changed in kind. Kraft (1989) identified two general directions in art research. One strand of influence—from the social sciences—accentuated production and use, focusing on the political, cultural, social, and economic conditions under which art is made and on subjects such as patronage, the art public, and workshop practices. The other strand—closer to the humanities—drew on critical, semiotic, and deconstructionist approaches, especially from literary theory and philosophy. Both strands differed from the interdisciplinarity of Panofsky, a prominent figure in the early twentieth-century formation of the modern discipline. Erwin was interested in the inherent meaning of works regarded as exact reflectors of attitudes and values. The new art history critiqued assumptions about self-evident meaning and uniformities of interpretation that ignore differences of ethnicity, gender, and class. Scholars began treating artworks as texts and as structures of signification. They weighed the relative merits of disciplinary methods and explored processes of professionalization. They expanded history’s relationship with criticism, aesthetic philosophy, markets, exhibitions, and museology. They used insights from Marxism to understand social and economic determinations. And they imported explanations of repressed instincts from psychoanalysis, power relationships from political theory, institutions from sociology, and structures from anthropology.

The relationship of art and science also changed. Science has long been a theme in art, providing narrative content and imagery. One of the fundamental properties of art—beauty—continues to be studied in terms of mathematical elements of proportion, pattern, and (a)symmetry. Domains of inquiry, though, have expanded. The science known

as psychology of art, which began at the end of the nineteenth century, now has ties with mainstream psychology, all disciplines of the humanities, art therapy, art education, and practitioners such as architects and curators (Lindauer 1998). Scholarly understanding of visuality also changed with new sciences and technologies of imaging, a development especially prominent in cognitive science and neuroscience. Emerging technologies have led to new forms and conceptions of art as well. Some new media, Sian Ede (2005) points out in her recent book on *Art & science*, make demands on multiple and differing mental processes. This complexity is evident in live art, sound art, digital art, Internet art, and film and video. In his international overview of the current intersections of art, science, and technology, Steven Wilson (2002) documents the many ways in which artists today are working at the frontiers of scientific inquiry and emerging technologies and the Internet, forging new relationships with biology, physical sciences, mathematics and algorithms, kinetics, telecommunication, and digital systems.

Ede highlights, among other examples, Andrew Carnie's *Magic forest*. Carnie worked with a developmental neurobiologist to find ways of visualizing the structure and growth of neurons. The resulting artwork was a walk-through installation in which viewers moved through a floating woodland of lacy winter trees. The trees were actually images of living brain cells in the process of conducting signals, captured using a laser-scanning confocal microscope, drawn with the aid of computer-imaging techniques, stained with fluorescent dyes, and projected onto layers of fine fabric. Images produced by new scanning technologies have a beauty that has led some to call them a new form of abstract art. Yet, Ede questions whether they are instead information and data, lacking inherent aesthetic properties of expression and abstraction.

Equally striking changes and implications have appeared in music research. While traditional musicology focused on Western music, cultural elites, and history, today's scholars are moving beyond these intellectual strictures. Musicology, broadly defined, addresses the music of all cultures (any country, group, language, or religion), all subcultures (such as modern youth subcultures), and all classes (owning versus working, privileged versus suppressed, and so on). The expanse of relevant disciplines includes acoustics, aesthetics, anthropology, archaeology, art history and theory, biology, composition, computing, cultural studies, economics, education, ethnology, gender studies, history, linguistics, literary studies, mathematics, medicine, music theory and analysis, neurosciences, perception, performance, philosophy, physiology, prehistory, psychoacoustics, psychology, religious studies, semiotics, sociology, statistics, and therapy. The cultural and epistemological diversity of musicology also became increasingly evident during the twentieth century, as smaller subdisciplines grew faster than traditionally dominant historical musicology. Comparative musicology, for example, in which different musical cultures are compared, emerged in a context of nineteenth-century colonialism. In the twentieth century it was largely superseded by ethnomusicology, which aims to view each culture in its own terms. Ethnomusicology grew rapidly due to increasing interest in non-Western cultures, and their sheer number and diversity.

Music research today can be subdivided in various ways. At the highest level, all music research is either historical/ethnological or systematic. That classification is not quite the same as the humanities–sciences split, though. Ethnomusicology comprises mainly humanities but also includes social sciences, while systematic musicology is mainly

oriented to sciences but also includes humanities. There is no widely accepted definition of systematic musicology, and implicit definitions shifted during the twentieth century. Modern systematic musicology is often held to include music philosophy, aesthetics, psychology, sociology, acoustics, computing, and physiology. These disciplines tend to address *general* musical questions. In contrast, historical musicology and ethnomusicology tend to focus on *specific* performances, pieces, genres, traditions, cultures, styles, and composers (Parncutt 2007).

To echo a point made in the introduction, subdivision of the main branches in music research also differs internationally. In Central Europe, musicology is thought to comprise historical musicology, ethnomusicology, and systematic musicology (cf. Adler 1885). The numbers of participants attending international conferences suggest that these three areas are now roughly equal in size. But, this structure does not clearly accommodate important and growing fields such as popular music or music performance research, or the traditionally central disciplines of music theory and analysis focused on musical scores. The North American tripartite division comprises historical musicology, ethnomusicology, and music theory, but has explicitly excluded scientific approaches such as music psychology, computing, acoustics, physiology, and empirical sociology, all of which are independently growing and thriving.

If musicology is defined as the study of music, it also includes the knowledge of musicians, regardless of their musical roles. This classification includes the history of performance practice, studies of composers' sketches, and psychological/sociological studies of performance. Recent research on group creativity in popular music is also focusing on the political, cultural, social, and economic conditions under which music is produced. This development suggests a third possible tripartite subdivision of musicology: into humanities, sciences, and practice. Musical practice includes not only performance, composition, and improvisation, but also education, medicine, and therapy (applied musicology). This alternative tripartite structure exposes the most salient epistemological differences within music research.

### 9.3 Rethinking (inter)disciplinarity in art history

Change, as always, provoked debate. The primary faultline in both art history and musicology was, and continues to be, the divide between 'inside' and 'outside' the discipline proper. Some scholars see themselves as custodians of tradition and the internal purity of the object of 'art' or 'music'. Others see themselves as interventionists, critiquing and expanding the construction of their domains. Interdisciplinarity has been not only a driver of heterogeneity, fostering new communities of practice, it too is heterogeneous. In art history, one scholar might be investigating the social history of a genre with the goal of understanding how aesthetic forms are shaped by connotations of taste in particular time periods and cultural groups. Another might be borrowing from other disciplines to answer a historical question about the provenance of a particular painting. Others might be using new technologies to read Paleolithic imagery or to create digital-born art. The latter examples are 'scientific' in the sense of capitalizing on affordances of new technologies

and instrumentation. Yet, they are not scientific in the same sense as music psychology or empirical aesthetics, which have different methods and epistemologies and are based on scientific questions or hypotheses that can be confirmed or rejected on the basis of statistical analysis of data obtained in empirical investigations of music perception.

The shift from older forms of interart comparison to subsequent interdisciplinarity of word-and-image studies, the cultural turn in the humanities, visual culture, and images studies are further indicators of change. Interart comparison focused traditionally on similarities and differences between particular forms of arts, the influence of one art on another, common origins comparable to the ancient unity of stem languages, experiential psychological studies, and structural semiotic analyses that view arts as alternative language systems (Greene 1992). In its most ambitious forms, Mitchell (1990, 1994) explains, interart comparison argued for the existence of extended formal analogies across the arts capable of revealing structural homologies united by historical styles. At its best, it resisted compartmentalization of media into particular disciplines and the academic administration of knowledge. Yet, interart comparison had three major limitations. It was based on the presumption of a unifying, homogeneous concept (e.g. meaning or representation) and a positivist methodology of comparing and differentiating propositions. The strategy of systematic comparison and contrast also ignored other forms of relation. And, interart comparison was a ritualistic and generalized historicism that affirmed the dominant sequence of periods and a canonical masternarrative leading to the present. Alternative histories, counter-memories, or resistant practices were neglected. By and large, too, the insularity of disciplines was not challenged and superficial comparisons ignored crucial differences across art forms and genres.

The difference between the interdisciplinarity of interart comparison and word-and-image studies is illustrated by the work of Svetlana Alpers and Mieke Bal. In *The art of describing* (1985), Alpers expanded the traditional canon of privileged works while drawing on both visual and verbal documents pertaining to visual culture in the Netherlands during the seventeenth century, including ideas about vision in science and instrumentation. In *Rembrandt's enterprise* (1988), Alpers treated the artist as both the product and an instrument of change by analyzing the materiality of painting, economics of the art business, and Rembrandt's use of theatricality. In treating visual arts as sign systems, she demonstrated how paintings, photographs, sculptures, and architecture are imbued with textuality and discourse. In *Reading 'Rembrandt'*, Bal (1991) drew on methods from art history, gender analysis, and reader-response theory to explore theoretical and interpretive problems pertaining to relations between verbal and visual art. The context of works becomes a text that can be 'read' using a semiotic methodology that treats medium-bound terms such as spectatorship, storytelling, rhetoric, reading, discursivity, and visuality as aspects, not essences. Shifting attention away from the intrinsic properties of discrete visual and verbal domains opens up larger questions of representation and interpretation that facilitate systematic interrogation of the ways arts emerge, circulate, and are intertwined within a culture.

The cultural turn in humanities stimulated expansion of interdisciplinary theory and practice propelled by both strands of influence identified by Kraft in describing changes associated with the 'new art history'. The older text-bound and elite concept of 'culture' broadened, influenced by the more encompassing anthropological notion of the lifeways

of a people. Investigations of the political, cultural, social, and economic conditions of artistic production and consumption were framed by newer critical, semiotic, and deconstructionist approaches. In introducing a 1999 collection of essays on *The practice of cultural analysis*, Bal took a graffito on a wall as the starting point for defining cultural analysis as the central interdisciplinary practice for humanities. This short and uncanonical text-image is a public exhibit that even in its simplicity engages the complex interdiscursivity of visual performance and verbal argument. Cultural analysis is an ‘interdiscipline’ with a specific object as well as a set of collaborating disciplines that includes the social sciences as well as the sciences. It is primarily analytic and is representative of much of the interdisciplinary work that goes on in humanities and cultural studies today.

In *Travelling concepts in the humanities* (2002), Bal highlighted the methodological potential of concepts as the backbone of interdisciplinary study of culture. The major exemplars are image, *mise en scène*, framing, performance, tradition, intention, and critical intimacy. Concepts such as these exhibit both specificity and intersubjectivity. They do not mean the same thing to everyone, but they foster common discussion as they travel between disciplines, between individuals, between periods, and between academic communities. In the process of travel, their meaning and use change, and that changeability becomes part of their usefulness.

The term ‘image studies’ signals a further horizon in the changing relationship of art, science, and technology. Mitchell (1994, 1995) introduced the concept of a ‘pictorial turn’ to name the challenge that visuality presents to the dominant textual model of the world in humanities. Vision is a mode of cultural expression and communication as fundamental and widespread as language. The term ‘visual culture’ evolved from a phrase used in several fields, including art history, film and media studies, semiotics, history of science, comparative arts, and philosophical inquiries into art and representation. Conversations about visuality also occur in cultural studies, queer theory, and African-American studies, and among psychoanalysts, anthropologists, phenomenologists, theorists, and optical technologists (Mirzoeff 1998, 1999). Widening interest in images and visual knowledge led James Elkins to suggest that the proper term is no longer ‘art history’ but ‘image studies.’ Barbara Stafford has been influential in opening up this terrain in terms of research on scientific and other non-art images (Jones and Galison 1998). In *Echo objects* (Stafford 2007), she explores the cognitive work of images with insights from neuroscientific discoveries and evolutionary biology. New data confirm some traditional assumptions about cultural objects, but also exert pressure on and turns them upside down, whether talking about historical emblems or electronic media.

## 9.4 Rethinking (inter)disciplinarity in musicology

The heterogeneity of practices is evident in musicology as well. One scholar might be studying the integrative dynamics of opera, a performance art that requires the collaboration of experts from multiple disciplines and professions. Another might be examining questions of race in jazz studies. One might be studying the perception of emotion by listeners from different cultures. Another might study the effect of the acoustics of a

given musical instrument on the syntax (pitch, loudness, timbre) of music played with that instrument. One might study the role that music plays in determining or manipulating the psychological identities of young people, or even work on a collaborative team with an anthropological interest in the hybridization of cultural forms in contemporary genres. Yet another might study the relationship between hearing or performing music and linguistic abilities, as a possible strategy against dyslexia.

More generally, musicology is epistemologically diverse for several reasons. First, definitions of music itself are diverse and dependent on cultural and historical context. If music is defined as an acoustic signal that evokes recognizable patterns of sound, implies physical movement, is meaningful and intentional, is accepted by a cultural group, and is not lexical (i.e. is not language), each point in this list implies different disciplines or epistemologies. Second, music may be represented in different ways. Popper and Eccles (1977) divided reality into three 'worlds': in the physical world, music is signal and vibration (physics, physiology); in the subjective world, it is private experience (phenomenological psychology, cultural studies); and in the abstract world of information and knowledge, it is scores (notation) and sampled waveforms (music theory, computing). To this we might add a fourth world of *agents* (selves, egos, souls, spirits) in which music is constituted by the social interactions of performers, composers, and listeners (sociology, cultural studies). A third reason for musicology's epistemological diversity involves its contexts. Scientific subdisciplines such as acoustics, physiology, psychology, and computing tend to focus on music itself in different representations, whereas cultural subdisciplines such as history, ethnomusicology, and cultural studies focus on music's historical, geographical, and cultural contexts.

How should musicologists deal with this epistemological diversity? Clearly, no individual can claim to be an expert in all relevant disciplines—or even just two of them. Nor is any specific epistemology central to musicology. That implies that good musicology must be multi- and interdisciplinary. High-quality synergetic interactions between epistemologically distant disciplines can only be achieved by interdisciplinary teams, which should be promoted by musicological institutions. Several impediments, though, remain.

Institutionally, there is a deep divide in musicology between ingroup and outgroup subdisciplines. The ingroup is traditionally headed by music history and may also include music theory/analysis and cultural studies. The outgroup (the musicological Others) is largely scientific: acoustics, psychology, physiology, and computing. Between the two is an intermediate group of subdisciplines that, in conservative music schools and departments, are politely tolerated but relatively powerless: ethnomusicology, pop/jazz research, music sociology, music philosophy, music performance research. Internationally, approaches to research often depend on nationality. That is understandable if the research object is music of different cultures, but surprising when general questions are asked. Consider, for example, music theory, whose principle object of research is the structure of Western musical scores (melody, harmony, counterpoint, tonality, rhythm, meter, form). North American music theory is traditionally characterized by a formalist, mathematical, positivist, 'scientific' approach and inspired by Heinrich Schenker's reductional approach to analysis (for tonal music) and Milton Babbitt's mathematical pitch-class theory (for atonal music). German music theorists are traditionally more intuitive and holistic, and

more likely to relate musical meaning to the social and historical context. There is a clear need for better cross-Atlantic communication.

Politically, musicological institutions also tend to assume that power is wielded by historical musicologists, and that it is legitimate to maintain that power by exploiting the ambiguity of the word ‘musicology’. Musicology sounds more interesting, relevant, and important when it is broadly defined—as in leading (historically dominated) music encyclopedias such as *Grove’s dictionary of music and musicians* or *Musik in Geschichte und Gegenwart*. But, when it comes to decisions that affect all musicologists, such as what aspect of musicology should dominate in programs of study or which ‘musicological’ grant applications should be funded, ‘musicology’ is tacitly assumed to be historical. The International Musicological Society aims and claims to represent all of musicology, but most of its members, officers, conference papers, and journal contributions are historical; the ethnological proportion is increasing, but the systematic (scientific) proportion remains negligible. As a result, outgroup researchers do not identify with musicology (they do not call themselves ‘musicologists’) and are not motivated to contribute to musicological institutions.

The challenge of diversity is amplified in interactions between humanities and sciences. They have never been easy, because of enormous differences in basic beliefs and assumptions. While humanities scholars may primarily be interested in specific examples of a given phenomenon, scientists may prefer to focus on phenomena whose frequency of occurrence is statistically significant. While humanities scholars strive to experience a research object directly, personally, and vividly, while tending to trust personal experience, intuition, and introspection as sources of evidence, scientists try to distance themselves from research objects in order to objectively compare hypotheses with data.

The tension between humanities and sciences is deeply ingrained in academic structures and traditions (Snow 1959). The conflict dates to Ancient Greece. Aristotle’s philosophy was similar to that of modern empirical psychology, focusing on perception, systematic observation, and association, while Pythagoras anticipated modern humanities scholars in his opposition to empiricism. For Pythagoras, music was divine, perfect, and inseparable from pure mathematics and astronomy. His spirit, which dominated medieval music theory, lives on the formalism of North American music theory, while the tendency of British music psychology and sociology to regard music as a phenomenon of everyday life (DeNora 2000), not manuscripts and concert halls, harkens back to Aristotle. The emergence and rapid growth of a new, US-led approach to music psychology in the 1980s and 1990s also led to a general increase in interest in empirical approaches and methods, which expanded to include qualitative methods and spilled over into other musicological subdisciplines such as music sociology and music theory.

As the twentieth century drew to a close, technological developments enabled new advances in music physiology, and especially neuroscience. Music psychology has grown rapidly since the 1960s following psychology’s *cognitive turn* (a reaction against behaviorism); the cognitive paradigm has been applied extensively to the perception of musical structure, and advances in computer technology have expanded the methodological possibilities. Music information sciences include computer music (computing and composition), computing in musicology (computer-based analysis of musical scores),

and music information retrieval (automatic extraction of culturally and perceptually interesting information from sound files). Advances in brain imaging technology during the 1990s provoked rapid growth in music physiology and the neurosciences of music. Within the sciences, the growth in music psychology has attracted representatives of other disciplines such as information sciences, acoustics, and physiology to collaborate with psychologists and achieve a new modern realization of Adler's systematic musicology.

## 9.5 Conclusion

Two overriding points emerge from a comparative reflection on interdisciplinarity in art and music research. First, it is harder to talk in the singular anymore. In a pluralistic conception of discipline, Pasler (1997) suggests, the question is not so much what is new or old, or what needs to be replaced or superseded, rather what each perspective can enrich by the presence of the other. Research on both art and music has been likened to a web and a network of cross-secting, sometimes conflicting, and sometimes cross-fertilizing influences. However, the second point follows from the first. In the midst of an expanding repertoire, institutional challenges continue to haunt both disciplines and related fields. Talk of increased interdisciplinarity must be accompanied by strong educational programs that provide training in both the methodological and epistemological foundations of individual disciplines and integrative methods. As the twentieth century progressed, for instance, the three main European subdisciplines of musicology became increasingly independent and isolated. Constructive interactions among historical, ethnological, and systematic subdivisions are rare, both locally (within departments) and globally (in conferences and journals). If musicology is to make progress as a unified, socially relevant, and financially buoyant discipline, musicological institutions should take decisive action. A similar challenge confronts research on art, visual culture, and image studies. Professional associations and curricular categories still segment differences, and links with interdisciplinary fields such as cultural studies and media studies are neither fully identified nor robust. Differences should not be erased, but relations and boundary questions need to be addressed proactively and reflexively in the practice of research and education. That can only be achieved, however, if experts work together—creatively, constructively, and as intellectual equals.

The same may be said of the larger relationship between humanities and sciences. Conflict resolution techniques (Deutsch *et al.* 2006) offer one means of unification. Yet, their power remains unequal. In proportion to the social relevance and pragmatic value of sciences, humanities have too little influence both within universities and in society generally, when one considers the central and undiminished importance of identity and meaning for all humans and all cultures. Competition for resources should be fairer and more transparent. And researchers in both humanities and sciences need to learn more about each other by improving communication in both scholarship and teaching, facilitating mutual critical reflection on the strengths and weaknesses of interactive fields and methods. Reflecting on the track record in the psychology of art and creativity, Martin Lindauer (1998) lamented that it is still framed by opposition more than cooperation.

He called for greater reciprocity and mutual illumination, a call echoed by across the expansive domains of art and image, music and sound. Superficial generalization, *ad hoc* borrowing, and reductive use of one discipline in the interests of another are not enough; deep, detailed, synergetic interactions are necessary. The history and practices in this chapter illustrate the richness of interdisciplinary research but affirm the importance of more systematic attention to both its intellectual and its institutional dynamics.

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