

A Psychohistorical Philosophy for the Science of the Arts

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Main Text

Some enquiries into the relations between arts and sciences have engaged with, and sought to overcome the Two Cultures view (Snow 1959). This view rests on the idea that the culture of the arts and the culture of the natural sciences are mutually exclusive and hostile to one another. Adherence to the Two Cultures view leads to scepticism about the prospects of cooperation between the creative arts and humanities, on the one hand, and the natural sciences, on the other. Artists and theoreticians in the humanities who defy and decry science and positivism are promoting ideas and actions that can support the Two Cultures view. Reciprocally, scientists who discredit methods and scholars from the arts with condescending attitudes can contribute to prolonging the influence of that view.

The Two Cultures view is fraught with problems. Along with a number of colleagues, I defended an alternative to the divisive pessimism that leads to, or motivates the Two Cultures view (see Bullot and Reber 2013a; Bullot et al. 2017). The background of this approach rests on the *co-dependence thesis* (Bullot et al. 2017), which posits that dependence relations have tied arts and sciences together in the past and continue to interlink them in the current historical context. These dependence relations have led to the formation of diverse and complex art-and-science nexuses over the course of human history.

Bullot et al. (2017) sketched an argument from shared mental capacities in support of the co-dependence thesis. It rests on the premise that a number of cognitive tools have been shared across both scientific and artistic practices. Arguably, cognitive tools shared by artistic and scientific cognition comprise emotions and heuristics in decision making, imagination and thought experiments, narrative explanations, and a variety of capacities for cultural learning (for example, imitation and teaching).

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From these shared mental capacities, we can infer that creativity and innovation in both natural sciences and the arts depend on a shared toolbox of cognitive tools and brain mechanisms.

In the next sections, I provide further support to the co-dependence thesis in an examination focused this time on the debate about the foundations of the science of art (Bullot and Reber 2013b; Seeley 2011). One of the brainchildren of Two Cultures view is the idea that some intrinsic characteristics of artistic and scientific cultures make it impossible to develop a science of art. This view raises two philosophical questions about the conceptual foundations of the science of art. First, is a science of art—or a science of the arts—feasible? That is to say, are there *fundamental obstacles* to the development of an integrative science of the arts? Second, if a science of the arts is feasible and desirable, what are the principles and methods that should provide its conceptual foundations? In what follows, I review discussions about the first question that also engage with the second problem.

The Contested Natural Sciences of Art

Science, Causal Explanation, and Intervention

To serve as background of this discussion, I will assume a conception of *science* based on three core ideas that have been discussed in philosophy of science. First, I assume that one of the aims of a scientific model—or theory¹—is to provide good *explanations* of the phenomena that the model seeks to describe and understand.² Second, the search for *causal explanation* is of particular importance to scientific thinking and practice. Third, causal explanation in science combined with technology can provide human learners with new ways to make predictions and manipulate the explained phenomenon.³

A number of scholars have an interest in scientific research about the arts and artistic projects inspired by science. In the former case, researchers have not reached a consensus on the principles and methods that should subserve a science of art in general, or causal explanation of specific artistic practices. Much theoretical contestation has occurred in relation to research that applies biological methods and models to the study of art. For example, there exists a debate about the conceptual foundations of evolutionary theories of art (Davies 2012; Dissanayake 1988; Dutton 2009). Another contested branch of the science of art focuses on using the experimental methods of psychophysics and psychology to study aesthetic responses to both artistic and non-artistic objects (see, for example, Berlyne 1971; Fechner 1876; Leder et al. 2004). Another field based on methods from biology uses brain sciences

¹In the present chapter, I use the terms *model* and *theory* interchangeably.

²For a sample of influential accounts of scientific explanation, see Hempel (1965), Salmon (1992), Thagard (1992) and Simon (2000).

³See, for example, Woodward (2003) and Craver and Bechtel (2006).

to investigate art and aesthetics; this field is known as *neuroaesthetics* (for recent surveys, see Chatterjee and Vartanian 2016; Skov and Vartanian 2009). Let me take as an example the debate about the foundations of neuroaesthetics.

Neuroaesthetics

Neuroaesthetics is a recent field of research. But it is important to be aware of its history and of doctrinal shifts among its champions. To explain these, it is useful to distinguish the statements made by a first wave of research in neuroaesthetics from a second wave, which relies on different claims and is still ongoing as a research program.

First Wave

The first wave of neuroaesthetic research on the visual arts was comprised of a few neuroscientists and allied philosophers of mind. It was paralleled by separate neuroscientific research on music.⁴ The contributions focused on visual art were published during a period of twenty years, starting around the last decade of the twentieth century. These works linked optimism about the prospects of a neuroscience of art (often implicitly understood as visual art) with the idea that the main role for neuroscientists in this field was to search for laws⁵ and psycho-neural universals of aesthetic experience and art.⁶

The researchers known as defenders of this aesthetic positivism include neuroscientists Ramachandran (2001), Ramachandran and Hirstein (1999), Solso (1994, 2000, 2003), and Zeki (1998, 1999, 2001), Zeki and Lamb (1994). In some works, they introduced their research about art as an inquiry into the ways art ‘obeys’ the ‘laws of the brain’,⁷ or as a search for neurobiological laws that explain artistic universals (Ramachandran 2001: pp. 11–12; 2011: Chap. 8; Ramachandran and Hirstein 1999). The search for universals of artistic cognition was also a central aim of enquiries developed by psychologist Pinker (2002: p. 404) and allied philosopher Dutton (2005, 2009: pp. 51–59). Both of them argued that there are universal signatures of art, such as virtuosity, pleasure, style, creativity, special focus, and imaginative experience.

A number of critics and art historians (Gombrich 2000; Gopnik 2012) and philosophers (Hyman 2010) have raised objections to the conceptual foundations of first-

⁴For the discussion of the neuroscience of music, see Peretz and Zatorre (2003), Levitin (2006), Levitin and Tirovolas (2009), Thompson (2009), and Patel (2010).

⁵For a defence of the search for laws in empirical aesthetics, see Martindale (1990), pp. 3–13.

⁶See Aiken (1998, pp. 24–25), Dutton (2005), Fodor (1993, pp. 51–53), Peretz (2006), Pinker (1997, Chap. 8), and Pinker (2002, Chap. 20), Zeki (1998).

⁷See Zeki and Lamb (1994) and Zeki (1999).

wave neuroaesthetics. Some divisive judgments made in these debates might have been indicators of the resilience of the Two Cultures view. In the next section, I discuss the objection from art's distinctness, which is an important objection that challenges the universalist approach to the first wave of neuroaesthetics. This backlash was paralleled by contestations of evolutionary theories that viewed art as an adaptation (Davies 2012; Patel 2010). In spite of occasional acrimonious exchanges, many researchers came to the realisation that these were interesting times to develop interdisciplinary research about the arts and reflect on the conceptual foundations of scientific theories of art.

Second Wave

I propose to identify the *second wave* in neuroaesthetics as the works in neuroaesthetics that attempt to identify and redress the shortcomings of the first wave in a spirit of greater collaboration with art history, philosophy and the humanities. Works of the second wave also include attempts to test hypotheses that have proven important in the debate about the first wave. The works published by Chatterjee (2011, 2013a), Chatterjee and Vartanian (2014), Shimamura (2015, 2012) and their colleagues are representative of this second wave.

Chatterjee and Vartanian (2016) propose a framework for reviewing a number of studies pertaining to neuroaesthetics. The framework is a tripartite model, which posits that both aesthetic and artistic experiences emerge from the interaction between three mechanisms of the human brain: the emotion-valuation system, the sensory-motor system, and the meaning-knowledge system. The framework aims to explain aesthetic processes by identifying components and functions of these three systems. Explanations that seek to explain a phenomenon by decomposing systems into components that cause a to-be-explained phenomenon are typically described as mechanistic explanations.⁸ Although mechanistic explanation is not the only type of explanation employed in biology (Dupré 2013), it is a sort of explanation commonly attempted by researchers in the cognitive sciences of art and, more specifically in neuroaesthetics.

Research on the emotion-valuation system provides illustrative examples. Consider empathy. There are reasons to think that the power of some works of art to move audience members can depend on our capacity to *empathise* with others. The capacity for empathy is a component of the emotion-valuation system (Chatterjee and Vartanian 2016). Freedberg and Gallese (2007) have argued that our explanation of responses to artistic works would be incomplete without taking into consideration empathy and the brain systems that cause empathy. In their account, the mirror neuron system is the core mechanism that causes empathy in both social and artis-

⁸Mechanistic explanations in science use the functional decomposition of a mechanism into parts and activities. Thagard (1992, 2006, 2019), Bechtel (2008), Bechtel and Richardson (1993/2010), and Craver (2007) have argued that mechanistic explanations is an important type of explanation in biology in general and neuroscience in particular.

tic situations. Thus, *pace* a number of critics of this approach (Bloom 2016; Casati and Pignocchi 2007; Hickok 2014), Freedberg and Gallese (2007) argue that empathetic responses to expressive paintings (e.g., dramatic works by Caravaggio, Goya and Pollock) depend on a brain system that generates embodied simulations of the emotions expressed by these paintings.

In another study of the emotion-valuation system, Brown et al. (2011) conducted a quantitative meta-analysis of 93 studies in brain imaging (fMRI and PET studies) of appraisal of positive-valence across sensory modalities. As used in psychological and cognitive sciences of emotions, the concept of *valence* refers to the perceived attractiveness (its goodness, or positive valence) or averseness (its badness, or negative valence) of a stimulus like an event, object, or situation. Within each category of sensory modality, the authors analysed studies using a wide range of stimuli. For example, within vision, they selected studies that included evaluations of pictures, artworks, images of food, erotic images, and images of loved ones. Their results suggest that the region activated most consistently across all four modalities was the right anterior insula. This is the region in the brain's core affective system, which is typically associated with visceral perception and the experience of emotions.

Brown et al. (2011) think that their meta-analysis warrants a bold conclusion about aesthetic judgement and the emotion-valuation system. Their conclusion is that, fundamentally, aesthetic judgment consists of the appraisal of the valence of perceived objects—that is, of attractiveness or averseness of objects. On their account, the neural system deployed for this purpose originally evolved for the appraisal of objects that provide survival advantage, which include nutritional food and attractive mates. Subsequently, this system was reused for generating the aesthetic experience of objects that satisfy social needs. Brown et al. (2011) include works of art among these socially useful objects. Following Brown et al. (2011), Chatterjee and Vartanian (2016) suggest that 'the pleasure that people derive from looking at beautiful objects taps into our general reward circuitry' (2016: p. 174).

Chatterjee (2013b) argues that neuroaesthetics can contribute to an interdisciplinary science of the arts by formulating and assessing general hypotheses about the brain mechanisms of artistic creation and appreciation. On his view, 'scientific studies' can even 'investigate the influence of historical meaning on appreciation of artwork' (Chatterjee 2013b: p. 138). Thus, Chatterjee is an optimist about the prospects of science of art understood as a neuroscience of art and aesthetics (neuroaesthetics). That is, his writings sketch a negative answer to the question of whether or not unsurmountable obstacles prevent the development of a science of art. Yet, his optimist account is more qualified than the accounts proposed by champions of the first-wave of neuroaesthetics. For he concedes to the critics of neuroaesthetics that neuroscientific methods can be inadequate to explore the historical dimension of the arts (Chatterjee 2013b; Chatterjee and Vartanian 2016: p. 189). Specifically, he argues that scientific studies 'cannot analyze historical meaning itself embedded in the artwork' (Chatterjee 2013b: p. 138), a methodological view expounded as follows:

If one believes that a critical level of analysis in art appreciation is understanding the unique information contained in individual works, the way a piece of art responds to its place in time, and is embedded in its local culture, then experimental science will be found wanting. Experiments, by design, draw general inferences from many examples of artworks. Scrutinizing layered historical meanings of an individual work of art is too fine-grained a level of analysis to be resolved by the lens of scientific experimental methods. (Chatterjee 2013b: p. 138)

The Problem of Art's Specificity

Assessments of evolutionary and neuroscientific theories of art greatly vary with respect to method and conclusion. That said, researchers in the humanities and social sciences typically study art in well-defined social contexts. Thus, they regularly opt for *contextualist* approaches, which depend on the 'thick' description of a cultural context or the careful examination of individual and idiosyncratic factors. Methods aimed at describing and analysing cultural and historical contexts therefore take the precedence over the search for universals and mental mechanism.⁹

Stern sceptics and pessimists about the science of art defend an affirmative answer to the question of the fundamental obstacles to a science of art (Gopnik 2012; Margolis and Laurence 2007; Margolis 2000; McFee 2011). That is, they argue that there exist obstacles to the scientific study of art that make such a science a highly unlikely or an entirely impossible endeavour. Other writers are moderately pessimists (Davies 2013), and a number of moderate pessimists have focused their objections on neuroaesthetics (Casati and Pignocchi 2007; Hyman 2010; Langer 2016; Noë 2011, 2015). Scholars who defend critical forms of philosophical naturalism or natural philosophy may be viewed as critical optimists about the science of the arts (Bullot and Reber 2013a; Bullot et al. 2017; Meskin et al. 2018; Seeley 2011, 2013; Thagard 2019).

One of the influential arguments brought forth by both pessimists and critical optimists rests on the idea that a number of scientific theories of art tend to miss an explanation of the factors that make a thing a work of art. This line of reasoning leads to what I will call the *objection from art's specificity*. This objection operates by referring to distinctive properties of the fine arts and then drawing attention to the fact that some generalising scientific methods or hypotheses fail to identify and explain such distinctive properties. The label 'objection from art's specificity' is of

⁹ Artists, humanists, and social scientists typically engage with artistic practices with contextualist approaches (Bullot and Reber 2013a; Danto 1964; Harrop and Bullot in press; Hogan 2013; Levinson 2007). Their view is *contextualist* in the sense that they understand works of art within the constraints of the careful interpretation of unique social and historical contexts (or artworlds). Fields such as the continental philosophy of art, art history and visual culture, media studies typically analyse artistic practices as anchored into a cultural and social context. Some contextualists, such as the anthropologist Geertz (1973), claim that the explanation of social practices (e.g., ceremonial and artistic practices) need to be explained by means of 'thick descriptions' that capture the significance of each social practice in its unique cultural context.

my own making. But it is an adequate label to categorise a highly coherent group of like-minded objections, which typically rest on the idea that the science of art is faced by the problem of identifying art. Both moderate optimists about the science of art (Bullot and Reber 2013a; Bullot et al. 2017; Seeley 2011, 2013) and pessimists (Casati and Pignocchi 2007; Davies 2013; Hyman 2010; Langer 2016; McFee 2011; Noë 2015) have discussed this objection or defended some of its versions.

Hyman's Use of the Objection from Art's Specificity

When applied to neuroaesthetics, the objection from art's specificity leads to the idea that neuroscientific studies of the arts have failed to identify and locate art. Hyman (2010) defends this pessimist line by focusing his critique of the first wave in neuroaesthetics on the objection from art's specificity. Ramachandran and Hirstein (1999) propose that the 'purpose' of art 'is not merely to depict or represent reality—for that can be accomplished very easily with a camera—but to enhance, transcend, or indeed even to distort reality' (1999: p. 16). They posit that, fundamentally, artists seek to amplify the essence of an object in an artwork. This is to induce powerful responses by the same type of neural mechanisms than the type that would be activated by the original object. Hyman (2010) aims to refute this hypothesis by presenting one of the versions of the objection from art's specificity.

The central premise in Hyman's (2010) argument is that 'Ramachandran's theory of art (...) doesn't distinguish between a work of art and the kind of object that it represents' (2010: p. 250). To illustrate this point, Hyman states that the theory 'doesn't distinguish between a sculpture that represents a woman with big breasts and a woman with big breasts'. From this, he concludes that 'the theory cannot be telling us what 'the key to understanding what art really is'' (2010: p. 250). The core premise here is that the response to an artistic depiction of a female nude by Ramachandran's amplification mechanism would not fundamentally differ from its response to a non-artistic female nude. If Hyman's interpretation of that mechanism is correct, then the objection could succeed in showing that the mechanism does not explain that which is distinctive of art, and therefore distinctive of our responses to works of art.

Hyman (2010) redeploys the objection from art's specificity in his critique of Zeki's early writings on neuroaesthetics (Zeki 1998, 1999). Zeki's research at that time posits that, in some cases, different genres of art—such as cubism and kinetic art—excite different groups of cells in the brain. In response to this view, Hyman argues that 'it is undeniable that we could not appreciate a painting by Mondrian if the cells in our brains which are excited by vertical and horizontal lines were not functioning properly' (2010: p. 255). But 'this does not explain why the painting is pleasing or interesting to look at, or what it means' and 'it reveals nothing whatever specifically about art'. This is because, Hyman continues, 'it is equally true that I could not see the text on a page or the railing in a fence if the cells in my brain which are excited by vertical and horizontal lines were not functioning properly' (2010: p. 255).

Although it has been presented in diverse versions, the objection from art's specificity tend to rest on two basic claims about that which a science of art is supposed to explain—the *explanandum* of that science. The first is a premise about art's specificity; and the second a premise about shared systems (in the sense of shared mental mechanisms).

The Premise of Art's Specificity

The first idea, which may be called the *hypothesis of art's specificity*, states that humans identify works of art as a distinct category of socially valued entities. Humans refer to distinctive properties of the exemplars of that category to differentiate these works of art from non-artistic objects. To specify the properties that are specific of works of art requires that scholars identify that which is distinctive of art. In philosophy, this task is traditionally associated with an ontological theory of art, which aims to elucidate the nature of art and define what art is (Currie 1989; Danto 1981; Ingarden 1989). Philosophers have proposed a variety of such theories, which range from theories identifying art with adaptive aesthetic processes (Anderson 2000) to opposing accounts that understand art as a purely social and normative historical institution (Dickie 1984/1997, 2000; Shiner 2001), through to accounts integrating both aesthetic and historical criteria (Davies 2015).

No philosophical ontology of art is uncontested. However, both amateurs and experts interested in art typically assume that there exist discoverable properties that set artistic things apart from non-artistic things. Thus, the idea that there are historical and mental facts that explain art's specificity is commonly entertained as a default expectation, or at least as a reasonable assumption.

The Premise of the Shared Systems

The second premise of the objection from art's specificity asserts that a significant number of the theories of art introduced in neuroaesthetics, or more generally biology, posit mental systems for aesthetic responses and artistic decision making that are also engaged by decision making and intercourses with non-artistic things. We may call this idea the hypothesis of *shared systems*.

Neuroscientists tend to adopt or defend the hypothesis of shared systems without seeing it as a threat to the science of art (Ramachandran and Hirstein 1999; Zeki 1999). A representative example is Brown et al. (2011) functional connectivity model (see above), which posits that aesthetic processing is the appraisal of valence of perceived objects by a core brain system connecting four regions (anterior insula, rostral cingulate, orbitofrontal cortex and ventral basal ganglia). According to this model, aesthetic appraisal results from interactions between subjective awareness of current homeostatic state (mediated by the anterior insula) and exteroceptive perception of objects in the environment (mediated by the sensory pathways leading up to the orbitofrontal cortex). That is, recurrent connectivity between the anterior insula

and the orbitofrontal cortex can mediate ‘homeostatic emotions’, which consist in the assignment of valence to objects as a function of current homeostatic state. In an explicit endorsement of the shared system hypothesis, Brown and colleagues write that the core circuit ‘is in no way restricted to aesthetic processing, but may be related to all cognitive processes that involve viscerality (...), as shown by the observation that it is active when people evaluate the truth or falsity of religious propositions’ (2011: p. 256).

Another version of the shared systems hypothesis is Freedberg and Gallese’s (2007) claim that empathetic responses to expressive paintings (e.g., dramatic works by Caravaggio, Goya and Pollock) depend on a ‘mirror-neuron’ system that generates embodied simulations of the emotions expressed by these paintings. It is clear in Freedberg and Gallese’s (2007) conception that such a system is used in non-artistic activities, indicating that it is a shared system.

Adoption of the shared systems hypothesis nonetheless poses a problem for neuroscientists. If the hypotheses of art’s specificity and of shared systems are both true, then one might be warranted in concluding that there exists a fundamental obstacle to a neuroscience and biology of art. For, if neuroscientific explanations can only describe brain systems that subserve *both* artistic and non-artistic functions (as suggested by the premise of shared systems), then it might be impossible for such explanations to discover the causal processes that are *distinctive of*, and *sufficient for* artistic functions and practices. This pessimist conclusion simply follows from the fact that the description of multi-purpose mental mechanisms of the human brain does not seem to offer a description of mechanisms that are sufficient to, and distinctive of artistic practices and experiences.

Critical Naturalism and Essentialism

Let us review the lessons that may be learned from the objection from art’s specificity. First, researchers engaged in the debate typically agree that models from the biological sciences can describe mechanisms that are *necessary conditions* of artistic experience and artistic practices. To take a simplistic example, researchers typically assume that having a human brain is a necessary condition of acting as an artist and engaging in art appreciation. However, referring to a very general biological condition of artistic practice—such as the brain—does not explain anything that is distinctive of art, understood either as a historically-situated social practice or as set of distinctive aesthetic experiences. Following this line of reasoning, the objection from art’s specificity defies scientists by raising a challenge about the explanatory scope of the mechanisms they posit in their explanations. How can a scientist demonstrate that the mechanism she or he posits explains a distinctively artistic phenomenon? How could the scientist demonstrate that the posited mechanism is not simply a general necessary condition to, but not a sufficient condition of art and its specificity?

A number of sceptics about the prospects of a science of art think that neuroscientists and biologists have failed to offer a persuasive response to the challenge posed by the objection from art's specificity. To them, typical models of art from the biological and cognitive sciences do not explain how we create and respond to *art as such*.

Pessimism About the Science of Art Grounded in Social Constructivism

A number of pessimists¹⁰ about the biological sciences of the arts appeal to social norms to justify the idea of art's specificity and the associated objection. On these views, to identify and understand the specificity of art, we need to explain the *social conventions* and *social norms* that govern artistic expertise and inform our responses to particular artworks. The explanation of these social norms in our engagement with art, they argue, lies outside the purview of biology and neuroscience (e.g., of the biology of our sensory-motor and emotion-valuation brain system).

According to some pessimist views, even if neuroscientists were seeking to explain neural correlates of the social rules that govern artistic practices, they could only describe systems of the social brain that function to support both artistic and non-artistic practices. That is the point made by the *shared systems* premise of the objection from art's specificity. So, again, these scientists would not explain how we identify and value *art as such* because they would neither investigate, nor include in their models the social systems that need to be understood to explain how we identify and value art as such.¹¹

Among the most radically *pessimistic* assessments of the science of art, McFee (2011: Chap. 8) maintains that contemporary neuroscience is irrelevant to our philosophical reflections upon an art form like dance. Other philosophers opt for less radical forms of pessimism. Among them, Davies (2013) is a self-declared *moderate pessimist* who has engaged with neuroscience. Davies argues that recent psychological empirical research on dance does not directly settle any of the core normative and ontological questions investigated by the philosophy of dance (for example, specifying the factors that make dance an art form).

¹⁰See Margolis (1980, 1995, 2000), McFee (2011: Chap. 8), Gopnik (2012), Davies (2013), and Langer (2016).

¹¹The argument can also be run with a focus on the evaluation of the social rules that govern artistic practices and judgements. When debating artistry and artistic values, people make normative judgements in relation to whether particular artistic decisions are good or bad, apt or inapt. But, says the pessimist, good and bad artistic decisions will engage the same shared mental systems. This idea again refers to the premise of the shared systems in the objection from art's specificity. From this the pessimist concludes that the biological and cognitive sciences describing these shared systems will not be of any use in understanding or justifying our normative artistic judgements. These sciences, consequently, fail to locate art (or good art) because such sciences do not offer us resources to understand the normative dimension of artistic creation and appreciation.

The Thesis of Critical Naturalism in Art Theory

In my research, I defend an approach to the science of the arts guided by constructive criticism and critical rationalism. The background of this approach is a thesis that we could call *critical naturalism* applied to art theory. The thesis of this critical naturalism holds that scientific enquiries can significantly contribute to our understanding of the arts and the ways in which humans respond to particular works of art. Specifically, to adequately address questions about artistic topics, we need to examine mental mechanisms and social systems that are studied empirically in the biological and cognitive sciences.

I use the qualifier *critical* in ‘critical naturalism’ to indicate that I am referring to a philosophical form of naturalism and ‘natural philosophy’ (Thagard 2019), which demands from the enquirer a philosophical and historical evaluation of the key claims made by scientists and scientific theories. This critical attitude is exemplified by the works that have developed and assessed the objection from art’s specificity. This includes Hyman’s (2010) evaluation of the first wave of neuroaesthetics, Seeley’s (2011, 2013) research on the cognitive science of art, and Bullot and Reber’s (2013a) critique of empirical aesthetics. The reflective analysis that is distinctive of critical naturalism demarcates this approach from the positivistic and reductionistic views holding that cogent sources of knowledge about the arts only come from biological models.

To develop one’s research as a critical naturalist and natural philosopher, one needs to be at least moderately optimistic about the prospect of fruitful collaborations between the arts and the natural sciences. Of course, critical naturalists and natural philosophers can be entirely pessimistic about the prospect of success of a particular scientific model.

To take an example of a task invited by critical naturalism, empirical research from the cognitive sciences is needed to test conceptual and philosophical theories of art (Bullot et al. 2017; Chmiel and Schubert 2019; Martindale 1990). Experimental research can help evaluate whether or not our best theories of an artistic practice match to the mental and social characteristic of our interactions with works of art. Where the results of this kind of empirical research contribute to our understanding of individual works and associated artistic practices, we can embrace them and incorporate them into our general and philosophical understanding of the arts.

Critical Naturalism and the Objection from Art’s Specificity

To the critical naturalist, objections presented by pessimists about a science of art should be seriously considered and thoroughly examined. The most interesting of such arguments will invite theoretical refinements and methodological corrections (Bullot et al. 2017). But such objections have neither argumentative acumen nor social influence capable of ending scientific enquiry into the arts. The current schol-

arly context is that of a growing interest in enquiries into the arts by an increasing number of new scientific fields (for example, neuroaesthetics, neuroanthropology, the theory of cultural evolution, cognitive archaeology and cognitive narratology). In this context, constructive objections to the science of art—such as the objection from art’s specificity—are best interpreted as genuine *parts* of the integrative science of the arts, and an integral part of our reflection about its foundation. This is in contrast to views of such objections as demonstrations of the *a priori* impossibility of a science of the arts.

This process of critical assessment and integration is exactly what could happen in the case of the objection from art’s specificity. Properly interpreted, the objection is consistent with critical naturalism. The objection from art’s specificity affects scientific theories of art that lack a credible ontology of art. Yet, this objection is not sufficient to demonstrate that there exists an unsurmountable obstacle to the advancement of a science of the arts. Rather than showing the demise of the science of art, it demonstrates the need for scientific models of artistic practices to incorporate a better understanding of the historical genealogy of the arts (Bullot and Reber 2013a, b; Danto 1964; Shiner 2001). This is because such a historical genealogy is what determines the specific ontological characteristics of each art genre. This historical understanding of the arts is needed to define the scope of any scientific model of art.

Critical Naturalism and the Problem of Essentialist Thinking

To the critical naturalist, a potential problem brought by the assumption of art’s specificity is that it can lead to essentialism (Gelman 2003, 2013; Newman et al. 2011; Wilson et al. 2007). An *essentialist conception of art* posits that there are distinctive and typically hidden properties of art in general. However, such a conception is questionable (Davies 2015; Gaut 2000; Levinson 1979; Lopes 2014). A problematic version of this idea consists in positing that art has an immutable essence, which would justify treating works of art as an entirely homogenous kind.

Thinkers won by the idea of an essence of art might seek to discover a definition that would characterise the distinctive essence of art. To such essentialists, an adequate definition of art would describe art’s hidden and permanent properties by specifying individually necessary and jointly sufficient conditions to art status. But a number of essentialist attempts to define art in terms of individually necessary and jointly sufficient conditions have failed (Gaut 2000). Typically, these definitions were falsified by historical changes in how humans have regarded art statuses. So, historical change and cultural innovations in the arts in particular can render essentialist definitions of arts obsolete. One of the lessons that we can learn from the history of the arts is therefore that essentialist scholars are unlikely to succeed in formulating an essentialist and universalist concept of art. Reciprocally, another of the lessons that can be learned from art history is that concepts of artistic works and genres need to be historically situated to be informative, and that such concepts can only be specified by genealogical and contextual enquiries (Shiner 2001).

A Psychohistorical Approach to the Problem of Art's Specificity

Let me end by suggesting that the reasons why we should resist essentialism in art theory may be linked to a solution to the problem of specifying art in the scientific theory of art. For there is a way to rebut the objection of art's specificity that offers a way to define the *explanandum* of a science of the arts. The solution I propose is what I have termed a 'psychohistorical' approach to the science of art. It brings us to my third thesis, the psychohistorical thesis.

A Psychohistorical Thesis

In response to concerns about the definition of art in a science of art, I propose a *psychohistorical thesis*, which states that the problem of art's specificity can be generated by an integration of the cognitive and psychological sciences of art with historical genealogies of the arts and their cultural diversity. That is to say, a method apt for explaining artistic practices and experiences—and thus rebut the objection from art specificity—consists in combining research on the mental and brain capacities engaged in the arts with enquiries into the historical and cultural contexts of such practices. The psychohistorical approach pertains to a family of approaches aimed at integrating psychological explanation and cultural factors in fields such as cultural psychology (Cole 1996/1998; Heyes 2018), cognitive anthropology (Henrich et al. 2010; Richerson and Boyd 2005), neuroanthropology (Lende and Downey 2012) and cognitive narratology (Hogan 2013; Kukkonen 2017).

If the view derived from the psychohistorical thesis is correct, then only a historical genealogy of art practices in their cultural diversity can appropriately address the problem of art's specificity. Consequently, enquiries into the history of art practices are necessary to discover empirical tools to identify specific arts. This is because each artistic practice needs to be understood as dependent on specific processes of cultural transmission and unique historical kinds. In addition, this thesis suggests that we should dismiss essentialist theories of art. But it also invites research on how essentialist thinking influences some of the ways humans respond to art (Gelman 2013; Newman and Bloom 2012). Let me illustrate the virtues of the approaches identified by the psychohistorical thesis.

Solutions to the Problem of the Explanandum of a Science of the Arts: Psychohistorical and Neuroanthropological Methods

A theory that is psychohistorical denies that there exists entirely ahistorical entities that should be called ‘art’ *tout court*. This is because the key concepts that make talks about the arts intelligible are historical concepts, the meaning of which is dependent on specific contexts. Primary among these historical notions are a family of concepts and norms codified in the eighteenth century to describe the *fine arts* (Shiner 2001). According to Shiner (2001), conceptions of arts and craft did not make the distinction between craft, technique and fine art. Analysis of the history of artistic practices and concepts make it possible to identify specific traditions in the arts in a manner that is both informative and amenable to multiple empirical methods of enquiry.

Contextualisation and Genealogies of the Arts and Artistic Concepts

In the day-to-day practice of the scientific enquiry about the arts, researchers adopt a psychohistorical and psychocultural methods when they clarify their research questions with respect to a specific social *context*. This attitude differs from the method based on asking ahistorical questions guided by an essentialist conception of art. This contextualisation offers ways to address the problem of art’s specificity. Once located in cultural and historical situation, a question about any work of art is tied to ‘thick’ conceptual categories that reflect the context in which the investigation is taking place.

Once contextualised, it becomes clear that any genuine understanding of that work is contingent on a grasp of the relevant historical and cultural categories. Thoughts about artistic specificity are grounded by the idea that each of the arts pertains to a cluster of historical categories, which forms a conceptual network associated with specific artistic kinds. Thus, historical analysis avoids the problem of circularity in the task of defining the arts. An appropriate psychohistorical method consists in combining an enquiry into the systems that cause the specificity of artistic things (and thus takes in account the historical specificity of the arts) with an analysis of the mental systems we use to identify and respond to such artistic things.

Art Appreciation

In my previous research about art,¹² I have applied the psychohistorical approach to the study of the way we respond to works of art. In this context of art appreciation, the psychohistorical approach offers a conceptual framework to address the problem of art's specificity. To explain how this solution works, let me illustrate the approach with an example.

Consider the varieties of responses that can be offered to a painting in a Museum of Contemporary Art. Imagine Clement,¹³ a visitor of that museum. Clement believes that one can ascertain the value of a painting from the first visual encounter of its aesthetic properties. He even thinks that his duty as an influential art critic is to make a first evaluation of a work of art in a state of mind untainted by beliefs about the artist and the social context in which the work was painted. At some point in his visit, Clement visually encounters a painting that includes a large oblong and flat visual object shaped like a cucumber and filled with dots. Radiating from the oblong object, there are twig-like lines that operate like routes and lead to large circular peripheral objects made of concentric circles of dots and lines (each one looks like a target).

At the moment of this brief visual encounter, Clement is in a situation that Bullot and Reber (2013a) classify as *basic exposure*. This term refers to a situation where a person (i) is perceptually exposed to a work for the first time and (ii) has not made any deliberate and conscious enquiry into the history of the work and its cultural context of origin. In that situation, Clement's actions and judgements are guided by capacities that regulate his perceptual and emotional sensitivity to the work. These mechanisms may include processes of the brain systems that Chatterjee and Vartanian (2016) identify as the sensory-motor system and the emotion-valuation system. In responding to the work, Clement's mind can succeed in performing a wide range of tasks, which may include detecting statistical regularities, recognising bodily gestures (mirroring), or responding with primary emotions and sensory pleasures. Although Clement might enjoy the experience of basic exposure to the painting, he would not be able to reliably perform a number of key tasks in relation to cultural learning, work identification, and artistic evaluation and value. This is because, being under the condition of basic exposure, Clement does not have access to historical and cultural information needed to successfully complete these tasks.

Take for example the identification of artistic categories relevant to interpret the painting. Let's assume that Clement's is mostly knowledgeable in European and American modern art. Basic exposure to the painting might activate Clement's recollections of traits of abstract expressionism, which may lead Clement to posit that the structure depicted in the piece was painted by an artist whose work pertains to the tradition of abstract expressionism. On this occasion however, this classification would be an artistic misunderstanding (Bullot and Reber 2017). The painting

¹²I proposed the idea of a psycho-historical model in Bullot (2009) and expanded this idea in Bullot and Reber (2013a).

¹³In this narrative, the character of 'Clement' is loosely inspired by Greenberg's (1999) methods in art criticism, which emphasised intuition and immediate experience.

I was trying to describe, which is entitled *Euro story* and was part of the exhibition *Tjungunutja: From Having Come Together* (The Museum and Art Gallery of the Northern Territory, 2017-2018) was painted in 1972 by Australian Indigenous artist Uta Uta Tjangala. The term *euro* refers to a species of marsupials (*Macropus robustus robustus*, also known as ‘wallaroo’) of the family of macropods (which includes kangaroos and wallabies). Critical aspects of the cultural and environmental context of this painting need to be learned in order to identify the relevant categories necessary to understand the painting.

Tjangala was one of the artists of the Papunya Tula cooperative (Johnson 2010). Papunya Tula, or Papunya Tula Artists Pty Ltd, is an artist cooperative formed in 1972 that is owned and operated by Indigenous people from the Western Desert of Australia. The group is known for its work with the Western Desert Art Movement, popularly referred to as ‘dot painting’. Credited with bringing Aboriginal art to world attention, the artists Papunya Tula inspired other Indigenous artists and styles.¹⁴ The work was exhibited accompanied with this note, presumably a description of the painter’s intention: ‘This painting depicts a group of Euro ancestors who have sought refuge from a fire at a waterhole. The waterhole is depicted by the central circle. The adjacent concentric circles are the homes of the Euro. The diagonal lines represent the bushfire’.¹⁵ Because the work does not pertain to Western modernism and includes pictographic and diagrammatic elements, one would commit a major artistic misunderstanding if one were to classify it as a contribution to abstract expressionism and Western modernism.

The only way for Clement to avoid the artistic misunderstanding and biased evaluation just described is to learn about the history and cultural context of the work. For this, one may investigate the work as a trace of artistic decisions. This may lead to an active enquiry about the human agents who made the work, preserved it over time and curated its exhibition. This approach succeeds because each and every work of art is a historically situated trace that carries causal information and is part of cultural categories. Learning about these historical traces is what provides audience members with resources to identify artworks and their social functions. Clement could, for example, aim at having these questions answered: What is the title of this painting? Who was the individual or collective person who created it? Are there remarkable features of its commercial, curatorial and cultural history? What are the conceptual categories¹⁶ that are relevant to describe the intentions of the artist

¹⁴The company operates today out of Alice Springs and is widely regarded as the premier purveyor of Aboriginal art in Central Australia.

¹⁵In addition to the work’s connection with core concepts from Pitjantjatjara people in central Australia (like the Tjukurrpa [*Dreamtime*]), we can discover that the painted figures were intended to be pictograms and diagrams. The painting is symbolic, it includes exemplifications and representations, as explained by notes made by the curator who worked with the artist.

¹⁶The historical categories that we use to identify works of art include: (1) categories of genre of fine arts such as *painting*, *music*, and *photography*; (2) technical concepts associated with a particular field of artistic practice (e.g., *chiaroscuro*, *tonality*, *synthesizer*, *chance operation*); (3) concepts of artistic styles, such as the *baroque* style, the *minimalist* style, or the *hip hop* style; (4) categories of norms used to identify and value of works of art, such as the concept of *formalism* and *modernism*.

and the cultural significance of the work? What could be the future legacy of such a work? These cognitive activities include what Bullot and Reber (2013a) called, after Dennett (1990, 1971) and Kelemen and Carey (2007), the design stance along with other causal and historical stances. In the artistic design stance, one adopts a strategy aimed at becoming sensitive to *unobservable* facts regarding the work and its history of production and cultural transmission.

This example illustrates that contextualisation and historical cognition are necessary to a wide range of responses to a work of art, which range from authentication of authorship and provenance to in-depth cultural interpretation. Without historical contextualisation, determining whether or not a thing pertains to a specific genre of art is not possible. Without historical and cultural contextualisation, it is impossible to learn whether or not the work under examination pertains to one of the traditional fine arts or one another cultural tradition. Thus, contextualisation is a fundamental process that needs to be understood in order to adequately address the problem of art's specificity. This point is made in a number of psychohistorical and psychocultural accounts. For example, a core hypothesis Bullot and Reber's (2013a) psychohistorical model is that processes of causal and social reasoning (for example, an artistic design stance) are necessary to artistic expertise and understanding, art authentication, and feelings responding to history of the work and the flow of time (for example, nostalgia).

By adopting the design stance and other strategies of contextual and social learning, artists and audience members gather the historical and cultural knowledge that enables them to identify what distinguishes a work or genre of art from non-artistic objects. The capacity to identify, value, and understand works of art as distinct from non-artistic objects therefore rests on the capacity to learn to categorise the work under appropriate historical concepts and relevant cultural notions such as *acrylic painting*, *Papunya Tula*, *conceptual art*, *Tjukurrpa*, or *baroque music*.

Psychohistorical Methods in Empirical Aesthetics

In their review of neuroaesthetic research, Chatterjee and Vartanian (2016) state that 'neuroscientific approaches are not ideally suited for extracting the historical, social, and cultural context within which works are produced and appreciated' (2016: p. 189)—see, also Chatterjee and Vartanian (2014). This acknowledgement led Chatterjee and Vartanian to conclude that 'multi-modal and interdisciplinary approaches that incorporate neuroscientific approaches would appear to be particularly fruitful for advancing our understanding of aesthetic phenomena' (2016: p. 189). This interdisciplinary aspiration dovetails well with both critical naturalism and the psychohistorical thesis. Still in support of an interdisciplinary approach, several projects¹⁷ of

¹⁷This research includes enquiries into the effects of *training and expertise* on art appreciation (Else et al. 2015; Hekkert and van Wieringen 1996b; Nodine et al. 1993), *framing effects* caused

experimental research have examined the roles of contextualisation and psychohistorical factors in the creation and appreciation of artworks.

To take the example of a contextualist idea that has received experimental support from empirical investigations, consider the hypothesis that artistic education and expert training in the arts modifies responses to works of art. The social transmission of cultural information and skills has been documented in diverse contexts by qualitative descriptions in anthropology, art history and sociology. In addition to this qualitative evidence, psychologists have measured the differences between experts and non-experts both in terms of subjective ratings (Hekkert and van Wieringen 1996a, b) and viewing patterns measured by eye tracking (Nodine et al. 1993). These studies suggest that, whereas nonexperts tend to favour representational paintings over abstract paintings, this preference is attenuated or absent among participants with expert training in the arts (Leder et al. 2012). This suggests that artistic instruction provides learners with skills to interpret and understand the significance of abstract art, which in turn may lead to rewarding experiences.

Coda

To recapitulate, the previous discussion was aimed at defending and illustrating three philosophical theses. Collectively, these theses sketch a conceptual framework for interpreting the relations between the arts and scientific research, and for contributing to an integrative science of the arts. The first thesis, the *co-dependence thesis*, holds that a history of dependence relations has bonded the arts and the sciences, and continues to link them in the current historical context. These dependence relations take place in historically changing art-and-science nexuses, which are studied by a variety of methods of cultural and empirical enquiry. Second, I presented a view consistent with the thesis of *critical naturalism*, which holds that scientific investigation of artistic practices and aesthetic experience can make significant contributions to our understanding of the arts. A desirable science of the arts may use critical analysis and interdisciplinary models to build integrative explanations of artistic practices and experiences (i.e., multidisciplinary explanations that combines research on the arts from both empirical and conceptual disciplines like philosophy). To support critical naturalism, I have discussed one of the objections that has generated pessimism against the science of art, which is the objection from art's specificity. Third, I have advanced a thesis regarding the *psychohistorical approach*, which states that a method apt for developing integrative explanations of artistic practices and experiences consists in combining research on the mental capacities engaged in the arts with enquiries into the historical and cultural genealogy of such practices. These three theses are philosophical heuristics in the sense of general thoughts that can orient enquiry and suggest more specific research hypotheses.

by artistic labels (Huang et al. 2011; Kirk et al. 2009; Silveira et al. 2015), and the importance of information regarding *artistic authenticity* (Newman and Bloom 2012).

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