Situated Cognition, Dynamic Systems, and Art: On Artistic Creativity and Aesthetic Experience

Ingar Brinck
Lund University

It is argued that the theory of situated cognition together with dynamic systems theory can explain the core of artistic practice and aesthetic experience, and furthermore paves the way for an account of how artist and audience can meet via the artist's work. The production and consumption of art is an embodied practice, firmly based in perception and action, and supported by features of the local, agent-centered and global, socio-cultural contexts. Artistic creativity and aesthetic experience equally result from the dynamic interplay between agent and context, allowing for artist and viewer to relate to the artist's work in similar ways.

*1. Putting Art into Context**

The production and consumption of works of art are distinct processes, and as such rarely are considered together. Usually, art production is dealt with by theories of creativity or portraits of the individual artist, while the viewer's encounter with art is considered in analyses of aesthetic experience or explained by reference to empirical data about the mind/brain. This approach makes it seem as if artist and viewer relate to art in radically different ways. It may appear reasonable, inasmuch as the viewer's relationship to art in comparison to that of the artist is predominantly passive. Yet, seen from a cognitive point of view, artist and viewer have more in common than what distinguishes them.[1]

The present article aims to show that the core of artistic practice and aesthetic experience can be accounted for by the theory of situated cognition (TSC) as integrated with the closely related dynamic systems theory (DST).[2] TSC *cum* DST furthermore paves the way for an explanation of how artist and audience can meet via the artist's work.

TSC and DST have only recently entered into the general discussion about the mind and brain, and cannot be regarded as common ground. Several of the features that make the combination of the two a viable alternative to connectionism and traditional theories of cognition based in symbol manipulation so far have not been widely recognised. The initial discussion of TSC and DST will present some of the elements that together provide a comprehensive and radically different view of the mind from the received one, and that might illuminate contemporary aesthetics.

Janus Head, 9(2), 407-431.

Research on creativity tends to stress the importance of context-free thought, the content of which is independent of what is present to the senses of the agent. Indeed, the capacity to disregard what is real and turn towards the imaginary is essential for creativity. Yet, this does not entail that creativity in general, as an activity, is independent of the context in which it occurs (Brinck 1999). Except for explaining what it means to say that cognition is situated and dynamic, Sections 2 and 3 also will elucidate what context-independence entails in the case of artistic creativity.

Sections 4-6 explain how the theories of situated cognition and dynamic systems apply to cognition to do with art. They argue that the production and consumption of art, like any other human activity, is an embodied practice based in perception and action, and supported by features of both the local, agent-centered and global, socio-cultural contexts of action. While human agents reconstruct the environment to enhance the ways in which it supports their activities, the environment in turn structures human behavior by providing the necessary scaffolding for performing physically, socially, and culturally defined acts. Artistic creativity and aesthetic experience equally result from the dynamic interplay between agent and context. This fact allows for artist and viewer to relate to particular artworks in similar ways, given that those of their cognitive processes that concern art emerge from resources found in the shared environment. Section 7 gives an outline of the relation between artist and audience.

To fend off a few common misunderstandings as to the nature of TSC *cum* DST, I will briefly discuss and reject three arguments that purport to show that perceptual and cognitive accounts of artistic practice and aesthetic experience imply reductionism in one form or another.

By being lumped together with theories that superficially resemble it, TSC has mistakenly been criticised for reductionism. For instance, theories that focus on the role of perception for creating and experiencing art tend to do so at the expense of isolating artist, artwork, and viewer from their social, ideological, and historical settings (Dengerink Chaplin 2005). Thereby facts about how the historical context shapes perceptual experience are ignored that are vital for understanding art in symbolic terms, as a social and cultural phenomenon. However, in taking a broad perspective on cognition, TSC repudiates any attempts to account for cognition in isolation from body and environment (cf. Beer 2001: 97). As Sections 2 and 3 will make clear, both the local, spatiotemporally confined situation and the wide, socio-cultural context essentially influence perceptual processing.

Another kind of reductionism occurs with attempts to reduce perception to brain processes or neural events (Ramachandran & Hirstein 1999). Evidently, the brain is necessary for perceptual processing. Yet, according to TSC, perceptual processes are constructed in real time in the interaction between agent and environment. As Harth (2004) remarks in discussing the relation between neurophysiology and art, a theory of artistic expression must take into account not only the human brain, but also the world at large. A description of the brain events that occur during artistic creativity (or aesthetic experience) cannot account for the nature of artistic creativity. Artistic creativity is not a property of the brain, but of human agents, which means that we can only make sense of it on a macroscopic level that permits talking about things like intentions and symbolic meaning.

Furthermore, the explanatory scope of TSC sometimes is misunderstood as stopping short at the boundaries of the physical body, leaving embeddedness out of the account. However, the main unit of the analysis of cognition arguably is the on-going interaction between the embodied agent and the context of action. An adequate description of bodily-based experience should begin in the agent's relationship to the surroundings, because experience arises from the interaction between agent and context. As Crowther (1993: 2) observes, the reciprocity of embodied subjectivity and the world is not only ontological, but also causal and phenomenological.

Finally, a few words of caution. Vision is given a prominent position in aesthetics, often dominating the other senses. The present approach is similar in this, but it should be stressed that hearing, touch, smell, and even taste all are implicated in perceptual processing. The vision system in the brain is linked to the other sensory systems, which permits interaction at an early processing stage. At a later stage, visual information is integrated with other kinds of sensory information to produce multimodal perceptual experiences and mental imagery.

2. Situated Cognition and Dynamic Processes

TSC stands for a bottom-up approach to cognition that has its basis in the claim that the evolution and development of cognition from simple to more complex processes are continuous (cf. Johnson & Rohrer 2006). The theory looks for support in the theory of biological evolution, data from developmental psychology, and analyses of the significance of the body for abstract thought by philosophers such as Dewey and Merleau-Ponty. Inde-

pendently of each other, Dewey (1916) and Merleau-Ponty (1945) argued that rational operations grow out of embodied, biological activities in local environments, and that an account of abstract thinking must begin with the sensory-motor system.

In line with this, TSC disagrees with theories that model cognition on conscious reasoning, as reflecting the ways thought processes are conceptualised in language. Instead, TSC states that cognition is 'active' in the sense that cognitive processes emerge in concrete situations of physical action and socio-cultural practices. In integrating conation and affect, cognition is driven by, on the one hand, the agent's current needs and motivation and, on the other, the contingent, contextual elements that support immediate action. Judgments made on-line that do not properly distinguish emotionally laden evaluations from factual belief provide the motives for action. Both emotional and factual information are essential for initiating and achieving action (cf. Damasio 1994), and cannot be separated in the individual case. According to TSC, explicit conceptual reasoning plays a limited role for on-line cognition. For the most part, it is used either in retrospect to make sense of the past or anticipation of one's own or other's expected behavior in future situations.

The dynamic interaction between agent and environment shapes the cognitive processes in real-time while they are unfolding. This means that any individual cognitive activity inevitably will be influenced by the properties of the situation in which it takes place, whether these properties are identified on a local or global level. Most of the contextual elements that are relevant for cognition have been specifically tuned to human agents by biological evolution and, in a shorter historical perspective, socio-cultural construction.

That cognition is *situated* implies that it is context-dependent. The claim that cognition is context-dependent is not controversial *per se*. Context can influence thought processes in a number of ways, accidentally or systematically, without in any way being essential to or constitutive of these processes. However, TSC champions a strong notion of context-dependence, to the effect that individual cognitive processes and states of the mind involve entities in the agent's surroundings essentially and actively (Clancey 1991). External entities that are recruited by the agent during on-going action will have a direct casual impact on the agent's behaviour, and play an important role in predictions and explanations of action (Clark & Chalmers 1998).

Conceived of a relation between thought and object, involvement is opposed to aboutness, the alleged distinguishing mark of mental states to concern entities to which they are not causally related (cf. Brentano 1874). Supposedly, aboutness is necessary for explaining how thought can be about non-existent entities, but as Section 3 will make clear, this simply is not true. There are other ways of explaining this, which means that a major reason for assuming aboutness has disappeared.

Haugeland (1998) eloquently describes the relation between mind and world as one of intimacy, a 'commingling' or 'integralness' of mind, body, and world. Cognition depends as much on aspects of the agent's environment as on the agent's inherent properties. Because it is the joint effect of these properties that control cognition, their contributions to individual cognitive processes cannot be considered one by one. As Haugeland observes, the level of cognitive complexity that an agent can attain at a given point in time is a function of the properties of agent and environment taken together. Consequently, cognitive processes cannot be understood properly if taken in isolation from either the agent or its environment.

The claim that cognition is situated can be split in two: one about embodiment, the other about embeddedness. To say that cognition is *embodied* is to say that it is functionally dependent on the motor activity and bodily experience of the physical agent (Johnson 1987: xiv-xvi). Embodiment pertains to the local situation, the here and now, of the experiencing subject. Since perception and cognition have evolved primarily for physical action, cognitive processes automatically are grounded in the physical and functional situation of the agent (Dewey 1916; Gibson 1979; James 1900; Johnson 1987; Merleau-Ponty 1945).

That embodiment implies *embeddedness* is an insight from ecology: A physical body will always exist in a surrounding context (cf. Gibson 1979). Since cognition is embodied, it is as well embedded, which means that any type of cognitive process is adapted to and depends on the setting in which it occurs. The concept of embeddedness shifts the theoretical focus from the mind as a bodily entity with physical and causal properties to the shared environment in which the processes of the mind take place and so from the nature of the cognitive processes to the socio-cultural practices that support them.

Lave (1988) emphasises that the social context of human beings is historical. Humans offload cognition onto the environment during on-going action and for future purposes. Knowledge, skills, techniques, and technol-

ogy are shared and transmitted by being embodied in tools and artefacts as well as in behavior patterns, procedures, rituals, and habits. The physical and functional properties of the means are conditioning the ways in which the information may be articulated. Therefore, factors such as economy and access to raw materials play an important role in determining the level of cognitive complexity of a society. According to Lave (1988: 1), cognition is *distributed*, i.e., "stretched over, not divided among—mind, body, activity, and culturally organized settings (which include other actors)." It involves the components over which it is distributed essentially—whether natural and organic or artefactual, they are constitutive of the cognitive activities for which they have been recruited.

To conclude, that cognition is situated means that it is extended in space and time and is continuous with processes in the environment. Because of the changing nature of the external resources that support the processing, single cognitive processes of the same type, say, memorizing something, will differ radically from each other depending on the place and period in which they occur, say, some 10,000 years ago, in the 18th century, or today. Notice that the innate cognitive capacities will remain the same, as long as there is not a genetic change.

Crowther (1993: 3) provides a criticism of accounts that attempt to detail the interaction between agent and environment. He maintains that any description of the ontological reciprocity of agent and context inevitably will be fragmentary and distorted, because pre-reflective reciprocity cannot be captured in words. However that may be, TSC sidesteps the problem by using DST to shed light on the reciprocity of agent and context. Because DST employs a mathematical notation, not a linguistic one, it avoids making explicit ontological commitments to distinctive subcomponents of the interaction. DST cannot be accused of failing to preserve or express the meaning of pre-reflective reciprocity, because its notation does not have the function to be meaningful in either the semantic or the ontological senses.

3. Higher-Level Cognition

As far as TSC relies on DST, it has been criticized for only being able to account for lower-level cognitive processes, such as perception and motor action. It is argued against it, first, that higher-level processes, such as logical reasoning, counterfactual thinking, and language use, cannot be explained in terms of the dynamics of sensorimotor structures, and, second, that the

context-independent nature of higher-level processes excludes environmental coupling. Had this criticism been correct, TSC *cum* DST would not be in the position to explain artistic creativity, nor the appreciation of art, since both activities to some extent involve reflexive self-consciousness and perhaps other higher-level cognitive processes too. However, there are a number of problems with the criticism. For one thing, the arguments rely on implicit assumptions concerning the nature of higher-level cognition, which themselves can be criticized. More importantly, they are based in what seems to be a misunderstanding of the explanatory scope of DST, and, further, they conflate different types of context-dependence.

The success of the *first* argument will depend on how it is interpreted. What is it about the higher-level cognitive processes that DST supposedly cannot explain? To arrive at an answer we must consider what it is that DST does account for. DST models the way in which the brain handles sensory input in order to produce adequate motor responses to changes in the agent's local environment. In doing so, it also provides a general framework for understanding dynamic processes, which can be used to analyse cognition in general, because any cognitive activity is grounded in the operations of the perception-action system. Cognition is explained in terms of how interactive forces make processes unfold over time, while cognitive processing is analysed as continuous state change in coupled systems. An individual cognitive process is described as the set of possible ways in which the process can develop in a space of possible trajectories.

DST depicts the interaction between mind and environment as a continuous, two-way, causal relationship, which holds between two dynamic systems that form an integrated whole. This process is called structural coupling. The two systems co-ordinate their behavior in real time in a progressive perception-action loop, where each system continually is influencing the processing of the other. Context and agent do not determine each other, but mutually specify each other in a co-implicative relation (Varela et al. 1991: 197). DST describes the interrelations between coupled individual systems, while leaving the nature of the systems out of the description. It is not what these component systems *are* that is important for understanding cognition, but what they *do*, and this crucially depends on how they are embodied and in which context they are embedded.

Because the framework of DST is radically different from the one put forward by traditional theories about cognition, known to use a quasi-psychological terminology, it may seem unsatisfactory from an explanatory

point of view. Still a theory about cognitive processing should not be expected to give insights into the nature of the conscious mind. To compare, while introspection reveals how cognitive processes are experienced, there is no indication that it reveals how such processes function. According to DST, the experiences we have of our own cognitive episodes are organised and structured by external tools and artefacts, which makes them socio-culturally grounded rather than neurophysiologically so. Ultimately, the properties that usually are ascribed to mental experiences belong to agent and environment taken together.

But can a theory that exclusively favors dynamic processes explain higher-level cognition? Isn't there more to cognition? The answer to the second question is no—and yes. No, because DST can indeed account for higher-level cognition without introducing new variables into the theory. By exploiting resources in the environment and learning from the interactions in which they participate, dynamic systems can develop complex cognitive processes. Yes, because higher-level cognition requires contextual support, and DST ignores contextual properties. DST refers to the effects that contextual features have on cognition, without considering the nature of the features that give rise to the effects. Its function is to account for the processing as such, nothing else.

Yet, when behavior becomes more complex and allows for the selection for actions directed at other actions, and not directly at the external context, it will be valuable to know not only which trajectories a process can take, but also how distinct trajectories relate to different contextual properties. For instance, the properties in the local context that affect emotions and evaluations can acquire a motivating function and influence long-term learning and short-term decision-making. The properties of the broad context enhance both cognitive tasks and the behavior that is produced in response to them, and may cause huge, social, and perhaps cultural, behavioral differences between groups. Leaving out the contextual properties in explanations of individual actions makes the explanations meaningless, thus useless, seen from the agent's perspective. This is where TSC reappears to rescue DST —DST in other circumstances being used to substantiate and strengthen TSC. TSC describes cognition in terms that at least are recognisable from a folk-psychological perspective and emphasizes the psychological and socio-cultural properties that stimulate the interaction between agent and environment.

The *second* argument against TSC *cum* DST—that the context-independent character of higher-level cognition excludes environmental coupling—stands in need of two separate replies, one that explains why context-independence is not inconsistent with environmental coupling, another that explains how, within the framework of DST, it is possible for cognitive processes to be independent of the context in which they occur.

The word 'context-independence' is frequently used to mean either that an item is (i) independent of the (spatiotemporal) context in which it actually occurs, (ii) independent of any particular context, or (iii) independent of any kind of context (cf. Brinck & Gärdenfors 2003). DST can account for the first two kinds of context-independence by so-called selective coupling. Selective coupling occurs when an agent has access to more than one external context and at a single moment is able to choose to which context she will couple next. The capacity for selective coupling enhances cognition considerably, and increases the flexibility of behavior. But selective coupling is not sufficient to account for all kinds of higher-level cognition. Even if the agent can choose to couple to another context than the one that is present to the senses, her next actions nevertheless will be governed by the selected context. The third, most radical form of context-independence still constitutes a threat to TSC, because it excludes any kind of coupling to the external context.

Theories of higher-level cognition often presuppose that thoughts can have any kind of object as long as it is conceivable (does not involve a logical contradiction), whether existing in the real world or being a mere personal fantasy. Many hold that thought about the non-existent is the distinguishing characteristic of mentality and makes possible higher-order cognition (cf. Brentano 1874). Supposedly, it requires a capacity for manipulating either abstract propositions or internal representations in the agent's mind, something that TSC *cum* DST rejects (Brooks 1991; Clancey 1991).

Nevertheless, there are suggestions as to how TSC can deal with imagination, based in the denial of a principled difference between perception-action processes and conceptual reasoning. Clark (2005) applies the idea of selective coupling to dedicated artefacts. He maintains that the disengagement of thought, when reason is operating in the absence of its ultimate target, does not imply disembodiment, nor de-contextualisation, which would occur if reason were to operate without dense, perceptually-saturated, local couplings. In a similar vein, Crowther (1993: 2) remarks that language is the highest function of the sensorimotor capacities, which

operate as a unified field and enable human beings to organize their surroundings.

Clark (2005) further argues that high-level reasoning is local and contextualized also when disengaged. Then real-world models, diagrams, language, or physical objects that serve as stand-ins for future events will provide the external context. Such concrete external symbols (*ad hoc* or genuine) create conditions of 'surrogate situatedness', thereby structuring the environment, and contributing to the management of the agent's attention. This move makes internal representations superfluous. Coupling is not necessarily to those entities that the on-going cognitive process is targeting, and neither to mental representations of them. External proxies are equally good, as long as they have a direct, causal impact on the cognitive process that is similar to the one that the target would have had during the same circumstances. These conditions are not difficult to satisfy, especially not by artefacts.

Natural language is a case in point, being a powerful means not just to off-load cognition from the brain to the external world, but also to enhance cognitive processing (cf. Vygotsky 1934). Clark & Chalmers (1998) assert that language is a complement to internal states, and not a mirror, and that it serves as a tool whose role is to extend cognition. The intimate relation between intentional expression and instrumental tool is brought forward in Gallagher's tentative reflection that "certain aspects of what we call the mind just are in fact nothing other than what we tend to call expression, that is, the current linguistic practices ('internal speech'), gesture, and expressive movement" (2005: 121, footnote 7).

4. The Body in Art

The aim of the previous sections has been to present an approach to cognition and the mind that understands cognitive processes as depending less on the agent and more on the surrounding context. Cognition has been described as an embodied activity that is conditioned by the environment. In the following sections, this approach will be applied to cognition in the areas of production and consumption of art. The hypothesis is that TSC *cum* DST can explain at least the core of both artistic creativity and aesthetic experience.

It has been questioned whether it is appropriate to describe artistic creativity and aesthetic experience as relying on similar cognitive processes

as perception in general. The major worry seems to be that such an approach will obscure what is peculiar to the field of art. For instance, Dengerink Chaplin (2005) underlines that artistic creativity is a specific aesthetic mode of symbolic practice that articulates the world as affectively experienced, something that might justify giving it a special treatment.

It is true that symbolic cognition differs from such that depends only on sensorimotor activity. Yet the essential difference between cognition in the field of art and in other domains does not pertain to the processing; on the contrary, artistic creativity exploits all sorts of processing. Its unique character is brought forth by properties of its typical context, which contains the resources that enable the activity, and the particular features that are involved in the processing. Considering the essential role of the context of action for any type of cognition, it is clear that the fact that artistic practice relies on similar forms of processing as other kinds of cognitive activities does not obscure its unique character.

The situated approach to cognition has much in common with the phenomenological theory advanced by Crowther (1993). Crowther favors a conception of embodiment, or 'body-hold', which takes into consideration the effects that specific socio-cultural contexts will have on individual agents' aesthetic experiences.[3] In arguing against postmodernist theories, he contends that there can be constant modes of experiencing and knowing that nevertheless are flexible in practice. These cognitive modes are at bottom sensorimotor capacities that structure the agent's context. Which structure the context in fact will receive depends on the nature of the physical and social interactions that the agent engages in. If the medium and form of the interactivity is complex, this will increase the complexity of the agent's 'unified field of the senses'. To Crowther's theory, TSC can add a precise, empirically based account of how different types of experience could emerge. Because TSC gives 'cognition' a wide interpretation, states such as goal-directedness, interest, and emotional evaluation, which all are based in bodily sensation, are held to play vital roles in driving the perception-action loop. Consequently, theories that regard affect as a central part of general aesthetic experience can be reconciled with TSC.

The body occupies a central position in art, most probably since its very beginnings, sometimes as an object of contemplation, often as a means to express something about the person whose body it is (what she is doing, thinking, or feeling, or how she relates to other people). As long as art is produced by and for human beings, it will deal with aspects of human life

—either directly, by making human conditions the topic of individual works and forms of art, or indirectly, in the sense that any representation of the world will be filtered through and articulated by human cognitive faculties. Art in all its forms is vital to man, because it is one of the few methods (if not the only one) available for interrogating and exploring human life at large. Given that embodiment is a fundamental human condition, the body obviously will be one of the most common subjects in art. However, during the last decades the conviction that the body is an illusion has increased in strength.

In the late 60's, women artists started to reclaim the body by producing art that centered on its typically female properties. During the 80's, a more sceptical approach emerged, questioning the fundamental aspects of the body, such as its conditions for identity and sex. It no longer was seen as an objective entity, the female characteristics of which had not received enough attention from artists. Instead, female artists took a theoretical perspective towards it as a socio-cultural construction that reflects power relations (sex, race, ethniticity, and so forth). This launched a keen interest in revealing the tacit codes that underlie traditional ways of depicting women in art.

Among women artists and viewers at this time, the general distrust of historically important materials and forms (because of their entrenched symbolic meanings) aroused curiosity about new technologies such as video, computer graphics, virtual reality games, artificial agents, and eye tracking. It also provoked a growing interest in the traditional techniques and crafts of women, such as weaving, knitting, and embroidery. From the 90's and onwards, these interests are reflected in the works of not only many female, but also male artists.[4] The illusory character of the physical body has become a central topic in art in general, and by many is recognised as a fact.

Against this background, it may seem strange, or even naive, to suggest that a theory centered on the ways in which the body is situated in contexts of action be used to explain artistic practice and the appreciation of art. However, although TSC takes the interaction between the 'unmarked' physical body and its physical environment as its starting-point, it does recognize that there is no such thing as an 'objective' and unchanging agent or context. The agent and its environment are continually co-constructed, and not only knowledge and skill, but also prejudice and values are built into contexts and behavior patterns.

5. From Gaze and Gesture to Artistic Practice

The present section is devoted to an analysis of artistic practice, which aims to show how this practice emerges from the interaction between perception and physical action in the local context. The following section will consider the influence of the broader socio-cultural context on artistic practice.

Visual perception is active, directed at initiating, maintaining, and ending actions (Gibson 1979). Its major goal is to keep the organism in harmony with its niche. Autonomous, functionally independent subsystems that operate without conscious control handle visual processing on a pre-reflective, subpersonal level. On the personal level, visual information is available for processing by the agent, who is now functioning as a global system that engages the various subsystems in parallel. When the information reaches conscious awareness, the agent can comment on it by bodily or verbal action.

That perception is embodied entails that it is physically located in space and time, and that space is implicit in vision. In a series of reflections on artistic creativity, the French painter Édouard Pignon declares that during the creative process, the form and color of the painting are determined in accordance with how the body experiences space, not with space itself (1966: 25). Pignon points to a fact that although self-evident, is strangely evasive. The body is so natural to us that, as long as it works all right, we tend to neglect its existence. We experience the things that we see directly, as if we were touching them with our very mind. Yet, perception happens in, not by way of, the body. This is to say that the body, on the subpersonal level that is independent of conscious awareness, actively modulates perception in determining which information will be picked up, when, and how.

Mere bodily intentionality is instrumental, a largely automatic means for physical action that locks onto concrete and physically accessible goals. In contrast, perceptual intentionality is driven by interest and emotion, is sensitive to learning, and produces flexible behavior. Although perceptual intentionality functions independently of reflection, it is experientially available to the agent, and can monitor actions that transcend the present. Gaze and gesture constitute the primary forms of perceptual directedness, having the double use of both performing instrumental action, and making manifest the agent's intention.

Artistic practice revolves around gesture, which has a double role to play. Gesturing shapes cognition, in the long term by (re)structuring the brain, in the short term by accomplishing thought (cf. Gallagher 2005). Besides, gesture structures space and organisez the spatial layout of the local context for the individual as well as for groups of agents (Goodwin 2003). Yokochi and Okada (2005) illustrate the last point in a case study of a traditional Chinese ink painter. They notice that the painter moves his brush in the air before actually drawing lines on the paper. To the hand movement, they ascribe the function of either positioning the brush on the canvas, or rehearsing how to draw, or generating images of what to draw. One might say that all these actions prepare the artist for his next stroke. He uses the brush to measure size and relative position, and to estimate the effect of an imagined stroke on the canvas.

Merleau-Ponty (1964) maintained that the artist's gaze is not in itself directed at the external world, but that the incentive to create arises from the objects themselves. Consequently, while working, the artist is not the author of his or her actions, but they originate in the objects.

Merleau-Ponty's line of thought can be spelled out using the concept of affordance (Gibson 1979). An affordance is a functional property that is relative to the agent. It defines the sum of possible actions that the agent can perform on the object that instantiates the affordance. Affordances operate independently of conscious awareness, yet are not merely causing behavior, but also control it by constraining the agent's range of action while supporting the actions that are enabled. The artist will be able to access the affordances that in a given context correspond to his or her effectivities, or operative skills.

Although the context is guiding the artist's actions, Merleau-Ponty (1964: 52ff.) somewhat surprisingly held that the elements from real life that the artist reproduces nevertheless will acquire his or her personal style. This style is encapsulated in the manner in which the artist perceives reality, and whatever the artist looks at will assume it. Like Merleau-Ponty, Pignon holds that artistic skill demands a particular style of seeing, which reproduces itself in action. Pignon stresses the importance of having an open mind; everybody must learn to see for himself (1966:78). To Pignon, this means ignoring the past and being open for what nature might reveal to the senses.

We can explain how personal style may arise passively from impersonal, contextually driven actions as follows. The biologically based way in which humans perceive the external world constitutes the foundation on which the

artist's special way of seeing is constructed. The artist acquires his particular gaze, or style of looking, through the physical activity of painting. It is forged by how, on different occasions, the artist takes possession of space—in the studio, outdoors, on the canvas, or elsewhere.

Hence, what might be called 'aesthetic perception' develops gradually during practice and is a product of learning by doing. If the artist's skill conditions his gaze in the manner described here, it seems to follow that the ways in which a skilled artist perceives the local context will differ radically from those of a novice or non-artist. The skilled artist, in contrast to the novice, will be paying attention to affordances that inform the actions and decisions concerning what to paint and how to do it.[5] Somewhat paradoxically, this means that in comparison to the novice, the skilled artist will rely more on contextual support and on cognitive processes that function independently of conscious awareness. In line with Merleau-Ponty and Pignon, we reach the conclusion that properties of the local context are driving the creative process of the experienced artist.

In Pignon's opinion, the skilled artist is not letting his mental images of the intended result control his actions, but instead lets the composition take form on the canvas while painting. Although statements like this might encourage a belief in supernatural powers of creativity and inspiration, this is far from how Pignon intended it. There is nothing miraculous about the process; it can be explained within the present framework. Much like space is implicit in vision, the content and form of the painting are anticipated by those aspects of the perception-action system that are activated subpersonally in the artist when standing before the unfinished canvas. Artist and canvas form a coupled system. Artistic practice starts with gaze, and then comes the gesture that accomplishes itself when the artist is in touch with the piece he or she is working on. Touch is mediated by the artist's tools, which embody his technique of choice while simultaneously being extensions of his body.

The trajectory of the creative process develops while the artist is working, in an interactive loop during which artist and canvas mutually specify each other. At a general level, the process is constrained by the artist's skills and command of the techniques he or she is using. However, artist and canvas together control its gradual progress, in the sense that each action that the agent performs on the canvas will change its state, and make the canvas provide the artist with new input that then will provoke another action in the artist, who will again change the state of the canvas, and so forth.

Drawing sketches is a well-known method for developing ideas in design, architecture, and art (Gedenryd 1998). That the creative process unfolds in physical action is evidenced by the case study of Yokochi & Okada (2005), which shows how the mental image of the goal (the finished painting) is gradually formed while the painter repeatedly is drawing sketches. Pignon (1966) provides additional support; Pignon calls the sketches he draws in nature 'notes', made in preparation for the work that later will be done in his studio (1966: 14f.). Looking back at some sketches that he had made on an earlier occasion, Pignon remarks that they were all articulated in a similar manner, by specific gestures or strokes of the brush. This articulation emerged when the hand was trying to mimic the scene that the artist perceived. Pignon realizes that while he was drawing, he was slowly learning how to see.

Hence, we can conceive of sketching as a way of giving form to and organizing one's sensory impressions on an implicit, subpersonal level. What the artist sees is during sketching directly transformed into action. The gesture articulates the artist's point of view and style of seeing, making the world visible to him anew. Evidently, artistic creativity is less genius and inspiration than an embodied, experientially based craftsmanship.

6. Contextual Resources: Support by Constraint

The skilled artist appropriates the technique he or she is using, embracing the tools, and turning them into parts of his own body. On the other hand, the tools shape any gesture that involves them. Events and knowledge on a larger socio-cultural scale inform and influence the unique style that springs from the skilled artist's gaze. Personal style will take different forms depending on which medium the artist happens to be using, and in part is determined by circumstances beyond the artist's control. As well, the universal features in art are constrained by the external resources. Because raw materials, media, and technology are products of history, whatever might be universal in art, will bear the marks of its time and be locked to a certain moment in history. "Man's control over matter has become continuously stronger and more accurate," wrote Valéry (1972: 30), reminding us that technical advances in practical life give artists their tools and methods, and that creativity in art is dependent on innovation in other areas.

The socio-cultural context plays an equally important role for individual and social cognition, locally in directly affording socially and culturally defined actions, globally in serving as a (at least periodically) cumulative,

long-term cognitive resource. The concept of availability concerns properties of the global context. Accessibility concerns those properties that the local context inherits from the global one, and that the individual agent can exploit at a given moment in time. By thus defining a space of possible actions for the agent, the local context determines which actions are in fact acceptable. In prescribing an agent's future actions, the accessibility relation acquires a normative function to the agent.

The influence of the global context on cognition is strong. Tools and artefacts do not only enhance and amplify cognition, but also crucially alter its processes. Human beings continuously reconstruct their environment to enhance the ways in which it supports their activities. The global context provides the necessary frames and scaffolding for performing functionally, socially, and culturally defined acts, which are recognised and respected among the members of the society, and shape behavior patterns and forms of life. It also invites the agent to perform new kinds of acts—within certain limits.

Much social knowledge is tacit, transmitted by procedures, rituals, and conventionalized ways of handling the physical environment. Thousands of years of knowledge and skills have been fossilised in the instruments, tools, and institutions that at present support thought and action (Costall, 1995; Hutchins, 1995). External items such as devices, media, and notations complement biological processing, and have a massive impact on the configuration of coupled systems. For instance, in addition to serving as external memories that store knowledge and embody available techniques, artefacts also crucially reflect shared evaluations and risk assessments.

Consequently, what an artist can create is not only constrained by his or her capacity for action as such, but fundamentally is conditioned, and hence made possible, by the environment in which he or she is situated. Certain actions and activities are available to the exclusion of others. In a case study of the Canadian artist Isabell Hayeur, Leclerc and Gosselin (2004) take a situated approach to artistic creativity, and like Dewey, consider cognition a problem-solving activity. They describe how conditions of the local context, such as the studio and the artist's equipment, together with general circumstances, such as access to resources like time and money, relationships with other artists, and contacts with funding agencies and galleries, crucially affect artistic practice.

When the physical and nonconceptual properties of an environment is changing, so does the ways in which it is conceptualized and understood, and at length also the foundations of knowledge. Discoveries and innova-

tions in science and technology transform the physical environment of the artist in precise and concrete ways. There are plenty of historical examples of how such novelties have resulted in drastic re-orientations in artistic practice. Two examples are glass and cast iron, which were used to build the exhibition hall of the first Universal Expo in 1850-51, viz., Crystal Palace in London. Another example is plastic, which had its breakthrough during the 50's, and then mainly was used in paintings and sculptures. New ways of conceptualizing the relation between reality and representation, such as the central perspective and the studies in anatomy in Italy during the 15th century, modify the reproduction of landscape, scenery, and the human body alike.

Hence, the technique of the individual artist emerges from the prevalent technology and its materials, tools, and procedures. These factors to a similar extent as intellectual ideas and ideology will predispose the artist to act in certain ways. In practice, the artist is confronted with questions that require action and not reflection. What might be created from a certain material, and how should it be done? What does the available technology afford, and which are its limits? Which are the values it implies? The answers to these questions reside in the objects themselves. The artist's chances of influencing the content of the answers depend on his or her talent for expressing them in a personal style.

According to Francastel (2000: 24), art is in itself a technology, the goal of which is simultaneously to explore and transform the world. Francastel holds that the manual skills and intellectual processes involved in creativity both constitute techniques. He bases his conception of the relation between art and technology on a study of how the two developed towards the end of the 19th century and at the beginning of the 20th. In describing the affinity between technology and art, Francastel makes clear their mutual influence on each other. Art and technology do not determine each other, neither do they stand in opposition; they inspire each other and develop together.

By changing the conventionalized conceptions of a society's available techniques and material resources, art can have repercussions on contemporary technology. Penny (1999) penetrates the differences between artist and scientists with respect to how they employ the technology of their times, showing how what might seem to be shortcomings of the artist, such as a limited knowledge of technology, in fact are advantages. One reason why the role of the artist is different from that of the designer, craftsman, or scientist, is that the artist is not expected to manufacture a functioning and reliable

product for daily use, but to ignore the rules of conduct that otherwise are respected. As a result, the artist can express and explore ideas that do not yet have a technical solution or an acceptable design, but still may be realized using tricks and low-tech patchwork methods. Furthermore, the fact that the formal demands are weak on art works leaves time to develop aspects of the artwork that will provoke strong viewer experiences. Penny (1999) highlights another distinguishing characteristic of the artist, concerning the artist's ambition to communicate with the audience. This ambition forces the artist to acknowledge that meaning is established in a cultural environment, and consequently to make his or her works of art accessible to the viewer by grounding them in the environment that artist and viewer are sharing.

Many contemporary artists are involved in exploring the potentials of present-day technology by testing and stretching its content and forms beyond their intended usage. Eduardo Kac and Victoria Vesna may serve as examples.[6] Kac combines robotics, networking, biological processes, and other media, linking virtual and physical spaces, to explore the transitory identity of the subject in our age. In some of his works, actions carried out by Internet participants have direct physical manifestation in a remote gallery space. Vesna is exploring what she refers to as "database aesthetics". To scrutinise the transformation of the Internet from a social space to a marketplace, she enables Web users to create, access, and modify a database.

7. Artist and Viewer

One of the artist's tasks is to take present-day technology beyond its prescribed domain and track down its expressions and values, the conditions it lays down for its use, and the prejudices it articulates. This is noticeable in contemporary art, in which the latest technology is tested and interpreted both practically and thematically.

Art is also the principal method for, on the one hand, understanding, and, on the other hand, constructing the self, and man in general. In our days, the investigation of the human organic body has been taken to its extreme. The energy that in historical times was put into giving a correct representation of the body has during the latter part of the 20th century been used to circumvent it. Artists such as Orlan and Stelarc use their own bodies to cross borders that once were thought to be absolute, with the help of plastic operations, prostheses, virtual reality, and more. The diversity and continuous expansion of current technology have given artists undreamt-of

opportunities to investigate specifically human conditions. Yet, as the means have multiplied, so have human forms of life.

Throughout history, art has played a central role in human life. For instance, it has been employed to cement power relations, make tangible social bonds and norms, and turn the memories of individuals into historical landmarks. It has as well served to question the things it elsewhere was made to support. In this case, success presupposes that the expressive means of the artist agree with those of the people being criticized. In a not too distant history, art belonged equally to the artist as to society, and was valued for other reasons than today. Artist and public shared at least some of the knowledge and conventions required for appreciating art. In modern times, other kinds of tools have taken over many of the functions that art used to have in society. Art is now in the service of individuals and small communities rather than the society as a whole, which has made it more exclusive.

Spelling out the exact experiences that an artwork will induce in the viewer is difficult, since it seems that these experiences may be as many as there are viewers. Yet, given that artist and viewer have the same kind of phenomenology and body, they will share the basic means for accessing the artwork. Obviously, the viewer will never be able to approach a work of art in exactly the same way to how the artist approaches it. The artist's access is privileged, simply because he or she has created the artwork.

Phenomenology aims to disclose the primordial conditions for vision, whether biologically grounded or transcendental. Within aesthetics, it has been criticised for doing exactly this, because revealing the perceptual capacities common to all human beings will not explain what is specific to art (cf. Kelly 1991: 158ff; Radcliffe 1991: 260ff). This kind of critique was countered in Section 4—on the assumption that cognition is situated and dynamic, what is specific to aesthetic experience will emerge in the interaction between agent and environment. The previous section explained how the environment restricts the artist's range of action. The environment also restricts the viewer's range of experience, which is how it can provide a common ground for viewer and artist.

Knowledge of how perception works is, if not sufficient, at least necessary for understanding aesthetic experience. Equally important is knowledge of how the local context elicits emotional responses. The agent's affective, pre-epistemic contact with the world surfaces as gut reactions or embodied appraisals (Prinz 2004). Affects serve an important evaluative purpose for

perception and action and color any sensory experience, including those that pertain to the aesthetic domain. Conceiving of perception and affect as situated enables us to explain how aesthetic experience relates to perceptual and affective experiences in general. While embodied experiences emerge during the agent's engagement with the local context, aesthetic experiences emerge during the viewer's engagement with works of art.

Although any aesthetic experience will be specific to a particular viewer and a particular artwork, it nonetheless will involve a universal element that is shared among viewers, because it is biologically grounded. Furthermore, viewers who belong to the same socio-culture automatically will share those aspects of the aesthetic experience that relate to the material resources from which the artwork is composed, including the ways in which to handle them, the values that surround them, and so on. In addition, the viewers will share any resources to do with the artwork's content. Finally, similarly to the artist, the viewer gradually develops an 'aesthetic perception', in practising to retrace (literally or in the mind) the gestures, experiences, and thoughts of the artist while standing before the work of art. In observing that not only the artist, but also the viewer needs skills to properly interact with works of art, Fels (2000) emphasises the symmetry between the artist's and the viewer's relations to the work of art. Artist and viewer turn out to have more specific points of contact than merely the biologically and socio-culturally motivated ones.

Artists using interactive artworks that involve modern technology to this very end are currently investigating if viewers engage with artworks in universal ways. For instance, a camera that upon registering the physical presence of the viewer will trigger a process that changes the layout of the artwork may examine the passive role of viewers. Likewise, an artwork that asks the viewer to intervene by, say, altering the processing of a computer programme that is controlling the artwork, can serve to study the viewers' active role.

The artists and engineers Simon Penny and Sidney Fels both employ contemporary technology to explore the contact between artist and viewer. Penny makes interactive, robotic artworks that emphasise the communicative aspects of the relation between artwork and viewer, using them to explore how the shared environment may promote interaction. Fels (2000) submits that aesthetic experience arises from manipulating objects skilfully, and that highly skilled performance requires an intimate relationship between agent and object. Using interactive artworks that involve video, computer

graphics, and audio technology, he discerns different degrees of embodiment, depending on how deeply embodied the object is into the agent or the agent is into the object. In the first case, the agent feels the object is an extension of him; in the second, the object controls the agent.

Forms of art that utilise interactive technologies obviously are suitable for investigating the relationship between viewer and artwork. Contemporary interactive art invites the viewers to actively engage with the art works and influence their final design. In contrast, during the happenings and performances of the 60's, the audience often was given instructions as to how it should behave. Today, the audience is solicited to edit the artwork.

8 Concluding Remarks

According to the present account of artistic practice and aesthetic experience, the fundamental ways in which artist and viewer perceptually engage with art are similar. The relationship between artwork and agent (whether artist or viewer) is experientially grounded in the agent's encounter with the work of art in the context of action. The interaction between artwork and agent is determined by, on the one hand, the affordances of the artwork and, on the other, the effectivities of the agent. The affordances and effectivities that have significance for the quality of artistic practice and aesthetic experience relate to bodily and perceptually based skills in the arts and related areas. However, which resources in fact are available in the global socio-cultural context of the agent will have a strong influence on the character of his or her skills.

The case of readymades and found objects illustrates that affordances associated with art have different consequences for action than those of the ordinary context of use. Consider the case of Tracy Emin's *My bed* exhibited at the Tate Gallery in 1999. Emin's bed was unmade and stained, surrounded by dirty underwear and litter. It stirred up a lot of anger. As viewers, we are supposed to regard the bed as a work of art, yet a woman was reported to have come to the exhibition with cleaning materials to tidy it up. Readymades confuse our intutions and make affordances clash.

Approaching aesthetic experience from the perspective of TSC *cum* DST uncovers what is common to artist and viewer. The present approach brings out a fundamental fact about aesthetics, specifically, that it is broadly cognitive, and as such, that any human being has the capacity for aesthetic experience. This fact sometimes appears to be neglected by theories that focus

on complex and radical forms of art to the detriment of the aesthetic experiences in daily life. The conclusion of the preceding discussion is unequivocal. Successful works of art are such that couple with the viewer—and coupling may equally consist in 'passive' contemplation as in 'active' making.

References

Beer, R. (2000). Dynamical approaches to cognitive science. *Trends in Cognitive Sciences*, *4*(3), 91-98.

Brentano, F. von. (1874/1955). *Psychologie vom empirischen Standpunkt. Band I*. Hamburg: Felix Meiner.

Brinck, I. (1999). Procedures and strategies: Context-dependence in creativity. *Philosophica*, *64*(2), 33-47.

Brinck, I. (2003). Att se, skapa och förstå konst. In *Från modernism till samtidskonst. Svenska kvinnliga konstnärer*. Eriksson, Y. & Göthlund, A. (Eds.), Lund, Signum.

Brinck, I. & Gärdenfors, P. (2003). Co-operation and communication in apes and humans. *Mind &Language*, *18*(5), 484-501.

Brooks, R. (1991). Intelligence without representation. *Artificial Intelligence*, 47, 139-159.

Clancey, W.J. (1991). Situated cognition: Stepping out of representational flatland. *AI Communications, European Journal on Artificial Intelligence*, *4*(2/3), 109-112.

Clark, A. (2005). Beyond the flesh: Some lessons from a mole cricket. *Artificial Life*, *11*(1-2), 215-232.

Clark, A. & Chalmers, D. (1998). The extended mind. *Analysis, 58*(1), 7-19.

Costall, A. (1995). Socializing affordances. *Theory and Psychology, 5*(1), 467-481.

Crowther, A. (1993). *Art and embodiment*. Oxford: Clarendon Press.

Damasio, A.R. (1994). *Descartes' error*. New York: Putnam.

Dengerink Chaplin, A. (2005). Art and embodiment: Biological and phenomenological contributions to understanding beauty and the aesthetic. *Contemporary Aesthetics*, 3.

Dewey, J. (1916). Rpt. *Essays in experimental logic*. New York: Dover.

Fels, S. (2000). Intimacy and embodiment: Implications for art and technology. *ACM Multimedia Workshops*, 13-16.

Francastel, P. (2000). *Art and technology in the nineteenth and the twentieth centuries*. New York: Zone Books.

Gallagher, S. (2005). *How the body shapes the mind*. Oxford: Oxford University Press.

Gedenryd, H. (1998). *How designers work*. Lund: Lund University Cognitive Studies 75.

Gibson, J.J. (1979). *The ecological approach to visual perception*. Boston MA, Houghton Mifflin.

Goodwin, C. (2003). Pointing as situated practice. In S. Kita (Ed.), *Pointing. Where language, culture, and cognition meet*. Mahwah, NJ: Lawrence Erlbaum Ass.

Harth, E. (2004). Art and reductionism. *Journal of Consciousness Studies*, 11(3/4), 111-116.

Haugeland, J. (1995). Mind embedded and embodied. In Haugeland, J. (1998), *Having thought*. Cambridge MA: Harvard University Press.

Hutchins, E. (1995). *Cognition in the wild*. Cambridge MA: MIT Press.

James, W. (1890). Rpt. *The principles of psychology*. New York: Dover.

Johnson, M. (1987). *The body in the mind*. Chicago: University of Chicago Press.

Johnson, M. & Rohrer, T. (2006). We are live creatures: Embodiment, American pragmatism, and the cognitive organism. In J. Zlatev, T. Ziemke, R. Frank, & R. Dirven (Eds.), *Body, language, and mind (Vol. 1)*. Berlin: Mouton de Gruyter.

Kelly, M. (1991). Richard Wollheim's 'Seeing-In' and 'Representation'. In N. Bryson, M.A. Holly, & K. Moxey (Eds.), *Visual theory*. Cambridge: Polity Press.

Kozbelt, A. (2004). Originality and technical skill as components of artistic quality. *Empirical Studies of the Arts, 22*, 157-170.

Lave, J. (1988). *Cognition in practice*. Cambridge: Cambridge University Press.

Leclerc, J. & Gosselin, F. (2004). Processes of artistic creativity: The case of Isabelle Hayeur. *Proceedings of the XXX Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Lawrence Erlbaum Ass.

Merleau-Ponty, M. (1945). *La phénoménologie de la perception*. Paris: Gallimard.

Merleau-Ponty, M. (1964). *L'oeil et l'esprit*. Paris: Gallimard.

Penny, S. (1999). Agents as artworks and agent design as artistic practice. In K. Dautenhahn (Ed.), *Human cognition and social agent technology*. Amsterdam: John Benjamins.

Pignon, E. (1966). *La quête de la réalité*. Paris: Denoël.

Prinz, J. (2004). *Gut reactions: A perceptual theory of emotion*. Oxford: Oxford University Press.

Radcliffe, D. (1991). On the critical value of categories: A response to David Summers. In N. Bryson, M.A. Holly, & K. Moxey (Eds.), *Visual theory*. Cambridge, Polity Press.

Ramachandran, V. S. & Hirstein, W. (1999). The science of art: A neurological theory of aesthetic experience. *Journal of Consciousness Studies*, *6*(6/7), 15-51.

Shusterman, R. (2000). *Performing live: Aesthetic alternatives for the ends of art*. Ithaca, Cornell.

Valéry, P. (1935). The idea of art. In H. Osborne (Ed.) (1972), *Aesthetics*. Oxford: Oxford University Press.

Varela, F., Thompson, E. & Rosch, E. (1991). *The embodied mind*. Cambridge, MA: MIT Press.

Vygotsky, L.S. (1934/1962). *Thought and language*. Cambridge, MA: MIT Press.

Yokochi, S. & Okada, T. (2005). Creative cognitive processes of art making: A field study of a traditional Chinese ink painter. *Creativity Research Journal*, *17*(2/3), 241-255.

Notes

* Work on this article has benefited from the seminars and workshops of the SEDSU Project, *Stages in the Evolution and Development of Sign-Use*, http://www.sedsu.org/, and was financed by the Swedish National Research Council.

[1] The term 'cognition' will be used in a broad sense, to refer to any states and processes of the mind that relate to skill, knowledge, and understanding – whether higher- or lower-level, 'hot' and emotional or 'cold' and inference-driven. Thus, the conative and affective processes of the mind are taken to be inherent to cognition. On the present conception, perception, categorisation, memory, recognition, attention, emotion, evaluation, and concept use are all examples of cognitive processes. Finally, artistic creativity and aesthetic experience are cognitive activities in virtue of involving cognitive processes.

[2] TSC and DST have only recently entered into the general discussion about the mind and brain, and cannot be regarded as common ground. Several of the features that make the combination of the two a viable alternative to connectionism and the traditional account in terms of physical symbol systems so far have not been widely recognised. The initial discussion of TSC and DST presents some of the elements that together provide a comprehensive and radically different view of the mind from the received one, and that might illuminate contemporary aesthetics.

[3] The present approach also has some commonalities with Shusterman's aesthetics (2000). Shusterman maintains that art should be studied as a practice, and underlines the importance of the sensory-motor system for aesthetic experience, suggesting that improvements of somatic awareness would further aesthetic experience.

[4] Cf. the 2004 touring exhibition *Boys who Sew* of the Crafts Council in London: http://www.craftscouncil.org.uk/boyswhosew/

[5] Using statistical analysis, Kozbelt (2004) shows that technical skill together with originality are strongly correlated with artistic quality, although originality fits the underlying quality dimension somewhat better. Skill constitutes an important part of expert knowledge, making it possible to perceive relationships among items that have to be calculated by less experienced subjects. The capacity to in this manner form immediate perceptual judgements is based in pattern-recognition and perceptual inferences, or associations.

[6] See www.ekac.org and http://vv.arts.ucla.edu/

Author's note: Correspondence concerning this article should be addressed to Ingar Brinck at Lund University. Email: ingar.brinck@fil.lu.se.