

# Art changes our way of cognitive and affective processing!

## But how to ecologically validly measure such processes?

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### Abstract

*Art experience means the rich experience of artistic objects that are mostly embedded in situational, social, and cultural contexts: for instance when encountering art in art galleries or museums. Art experience lets us reflect on the content, the style, and the artist behind the artwork—moreover, it lets us reflect about the percept, perception, the world, ultimately: about us. Current works in the field of empirical aesthetics unfortunately often ignore context factors that are so important for such deep and far-reaching experiences. Here I intend to refer to the different paths of measuring art experience by a) testing within the ecological valid context of art galleries via field studies, b) by simulating certain contextual and perceptual factors in a lab-oriented study design and c) by testing art-related material in labs without paying attention to such factors. The way we research art experience drastically changes the quality of the output, especially if we ignore certain essential factors which are typically involved when encountering art galleries in real life via path #c—mainly because participants do not show the typical motivation, interest and effort which they would typically face in art galleries. Furthermore, because the depiction quality of artworks, the context and the social situation in which they are inspected is fundamentally different in the lab, the respective impression is also very different. As most research ignores such factors, we might often be misled by the results of such studies; especially when the extraordinary and unique cultural status that makes artworks so different to ordinary objects is ignored.*

### Introduction

Empirical aesthetics is an emerging interdisciplinary field. Although originating from the very early days of experimental psychology—a field founded by Gustav Theodor Fechner and others back in the 1860s [1]—it was put in the back seat for a very long time. In recent years, empirical aesthetics underwent a kind of renaissance, specifically focusing on the aspects of art perception and art experience. In the present paper we will mainly be interested in art experience, as this concept provides an interesting opportunity to integrate multisensory channels [2], to learn about the relationship between cognition and emotion, and because here we face the challenge of how to measure complex psychological processual data paradigmatically [3].

### Art processing, experiencing art and the art of epiphanizing

Art experience is a rather complex concept. By the very nature of experiencing something, it always refers to a process. The process of experiencing something, e.g. an artwork, is characterized greater or lesser involvement during the process and by gaining “experience” or becoming “experienced” as an outcome of this process. A long series of such deeply involved episodes of experiences can even lead to what we call “expertise” in the specific field of experience. Most of the episodes we experience, however, are not deeply processed further, and so the respective events will not yield profound experiences—therefore they won’t reach the elaborated status of “deep experience”. To contrast the role of elaborated experiences, which lead to insights and might even lead to expertise in the longer term, we will employ the specific term *epiphanizing* in contrast to the shallow and more trivial type of experience that should be better termed by the neutral term *processing*.

*Epiphanizing* is generally signified by deep involvement; epiphanizing is a catalyst for dragging attention and creating meaning, it has the power of altering awareness and can result in long-term alterations of the perception of the self and the way we perceive and interpret the environment. Epiphanizing in the field of art reception (*Art epiphanizing*) is characterized by deep experiences when perceiving artworks, elaborating and reflecting on them and debating about them in social interchanges with others.

### The problem of measurement

The capturing of experiences is a major challenge for the social and human sciences. Two fundamental issues make measurement very demanding: 1) Experience is a personal thing. 2) Experiencing something is a process *in situ* without a definitive onset and length. Experiencing art, especially the deep form of *Art epiphanizing*, enhances the generally challenging situation as artworks are typically experienced within museums and often together with other persons in a socially and culturally embedded context. All these characteristics essentially delimit the application of rigorous experimental approaches. On the side of the beholder, *Art epiphanizing* is strongly modulated by trait factors such as personality [4] and expertise [5] and by state factors such as mood, expectation and purpose when encountering art [see 6]. It is further mediated on the side of the artwork by the framing, presentation quality and depiction size, and by the way the artwork is staged [7].

The most severe problem is that which psychology generally has: making the mental and often implicit processes decipherable, explicit, and measurable—and this without changing, biasing or

even halting the mental process, i.e. the experiencing, while doing so. To solve this issue is virtually impossible: we do not have an adequate translator at hand for making mental processes explicit. The field of psychology has developed a broad variety of methods to partly address this issue by combining different approaches at different levels of data granulation. Most measures are quite sophisticated due to the usage of advanced technical equipment, but they still lack the phenomenological babel-fish which is capable of transforming the phenomena of consciousness and experience into measurable units. Shifting this fundamental problem of phenomenology from psychology to neuroscience is thereby of no help at all. With methods of neuroscience we seem to have the magic key to the “objective basis” of experience in hand seeing as we can measure—or at least deduce—neural activity, but we quickly understand that we cannot exercise on an adequate level of data in this respect. Neuroscience can tell us important information about the location of the processes—even about when and where different kinds of information are interconnected, transformed or sent further—but the holistic phenomenon itself breaks down into neural bits.

A similar effect is caused when the standard experimental approach is employed: Experiments aim to cut down phenomena into manageable parts which can be independently varied. This is the only procedure that allows for causality to be tested and for effect sizes to be calculated for. For instance, in order to analyze the aesthetic appreciation of a Mondrian-like painting, experimenters might change the thickness of black lines, the hue of a certain square and the size of the painting independently. The essential problem with such structuralistic approaches is the neglecting of holistic phenomena—the Gestalt as a perceptual phenomenon is not just the sum of the parts but emerges from these parts [8]. The particular interaction between specific levels of different variables can instantly create a new quality of percept. Gestalts are not just linear extrapolations from certain qualities, but show disruptive changes in quality. Just altering the hue in one square or the thickness of one line might have the power to create an extraordinary aesthetic appeal or its opposite, the collapse of visual rightness leading to an aesthetic rejection of the entire work. Gestalt phenomena work due to holistic processing, so contextual effects play a major role potentially elevating a despicable “greasy corner” to an artistic “Fettecke” made by Joseph Beuys [9]. It is quite remarkable that the initial, and still advocated, method of researching empirical aesthetics is Gustav Theodor Fechner’s invention of psychophysics: physical stimuli are quantitatively changed and the produced sensations and perception are measured. But this procedure exactly creates the problem of decomposing or even ripping apart the Gestalt, and so the true and deep experience of art as something extraordinary [cf. 10]. This decompositional approach is misleading in further respects. First of all, it measures something different; sometimes fundamentally different to the allegedly targeted phenomenon. Secondly, this approach creates the illusion that epiphanizing is a process which can be endlessly repeated and systematically varied—but this is not true: sometimes just focusing on the very few artworks for which epiphany is felt is much more goal-leading than presenting an endless row of depictions for which participants do not show any interest. Thirdly, any kind of rigorous decomposition means that original artworks can hardly ever be investigated as such an approach has to alter the physical condition or the context factors of an artwork, which is hardly achievable in an art gallery; and so mere depictions, mostly presented on computer screens in labs, are employed instead.

## Empirical Approaches

Research in empirical aesthetics mostly follows three different paths of gaining knowledge on art epiphanizing (see Figure 1): Path #1) the ecological path of testing in the art gallery or museum; Path #2) the path where gallery qualities are simulated; and Path #3) the lab-oriented path.

The ecological path might seem to be the golden way of getting insights into the deep art experience process, as the context of the art gallery is not only simulated or partly mapped, but fully present: Testing in a natural setting actually happens while perceiving and epiphanizing artworks there. The potential data are indeed very rich and ecologically valid [11], but the proper measurement of them is rather hard to achieve; mostly impossible. At the moment when you start asking the museum visitor about her experience, she will artificially rationalize, will alter the typical processing and will potentially detach from affective processing. Path #1 in sum is promising in allowing the development of true art experiences, but the situation is not controllable, the variables cannot be varied and the beholders’ experiences can hardly be assessed at all. Path #3 characterizes a fundamentally different approach, representing most of the research conducted in empirical aesthetics: Here, all research is executed in a laboratory without the aim of simulating or emulating the art gallery context or the typical viewing conditions plus the affective and cognitive parameters which can typically be observed with real-life art visits. Clearly, this approach offers opportunities with low ecological validity, but shows very great possibilities of varying, systematically different experimental parameters. Material which might not depend too much on context factors and on personality variables might be adequately tested within such an internally very valid experimental setting. Path #2 tries to combine the advantages of Path #1 and Path #3 while excluding their more problematic aspects. The main aim is to simulate typical conditions in and with which artworks are epiphanized, while preserving the power and possibilities of an experimental approach. To achieve this aim, the experimenter has to know relevant details on typical viewing conditions, exploration modes, environmental factors and the social discourse about artworks in general (and sometimes even about very specific artworks). This calls for an extensive review of the literature and for conducting pilot studies on several side-aspects and parameters of specific settings. Furthermore, information on typical effect sizes of several factors is needed to balance the employment of different aspects due to their relevance to the targeted effects. Path #3 seems not to be an adequate method for gaining knowledge on deeper art-specific processes because deeper art experience, much less true art epiphanizing, won’t emerge. This path, however, can provide important data on important sub-phenomena and sub-processes which are parts of what we call art experience. So Path #3 can strongly assist and prepare conducting high-quality research via Path #2.

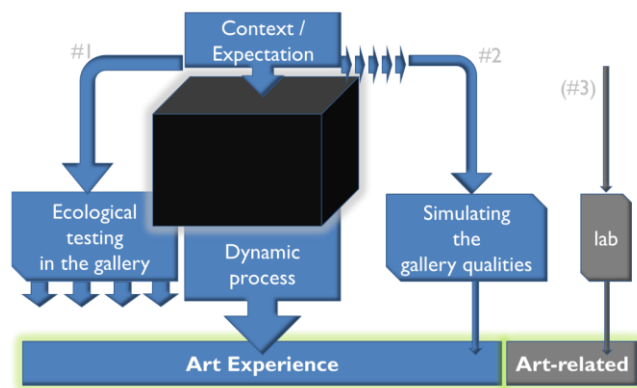


Figure 1. Three paths of research in order to gain knowledge on art-related processes. Paths #1 and #2 are for covering what is more about art experience or even art epiphanizing, path #3 is more about gaining data on art-related processes, sub-phenomena or art experience, or specific aspects of cognitive and affective processes when encountering depictions of art.

## Essential variables for simulating art gallery contexts

As we have learnt from the previous section, path #1 is theoretically a highly interesting route to gaining knowledge, but we mostly fail to practically reach the possibility of gathering together systematic data due to their embedment in natural contexts which cannot be experimentally treated. Therefore, path #2 seems to be a kind of golden middle ground, because we retain the typical power of experimental designs from strict lab-oriented research (see path #3), but participants still behave in ecologically-oriented contexts and situations [12]. In order to establish such contexts and situations, experimenters need a wide range of knowledge about the factors that play major roles in creating the contexts and situations which propagate deep art experiences.

Decisive information about these factors was compiled by researchers who tested or observed beholders directly in the context of an art gallery. Further valuable information was gathered together by empirical studies that systematically varied conditions in such a way that typical gallery conditions were included.

Smith and Smith (2001) were among the first researchers who went directly to museums to obtain information on the typical observation behavior of art gallery visitors. Based on their seminal observation study at the Metropolitan Museum of Art in New York City, they provided important data on typical viewing times for several person-related variables such as age, gender and group size. Just the mere viewing time of 27.2 s for an average visitor is an insightful piece of information as this is far beyond any viewing time condition employed in lab studies. Mostly, lab studies try to rely on the power of randomization and the vast number of stimuli, so efficient presentation time conditions are aimed for. Typically, presentation times in labs of below 3 s are realized, so this is just 1/10 of the natural viewing time condition. When observing visitors in a temporary exhibition in Germany exclusively devoted to the work of Gerhard Richter, even longer viewing times have been registered [13]: on average, 33.9 s for the first attendance to / inspection of the artwork and even 50.5 s for the total viewing time comprising all realized attendances. These even longer viewing times underline how fundamentally different museum-hosted versus lab-based processes of artworks might be. The fact that visitors in

art galleries often re-attend artworks after a while—we calculated that more than half of the observed visitors (55.3 %) re-attended an artwork [13]—especially stresses that such visitors do follow a self-paced and self-directed path through a gallery. This is very much in line with approaches of analyzing the trajectories of visitors self-navigating through a museum in a rather complex way, including re-attendances to artworks after a while [14].

When analysing the typical distance visitors use to inspect artworks, researchers found similar divergences to typical lab situations. An early work by Locher, Smith and Smith [15] uncovered viewing distances of between 60 cm and 120 cm when looking at small-sized paintings such as artworks of a size of about an A4 format. Not only did the visitors use much wider distances to artworks in an art gallery—on average about 1.72 m when viewing Gerhard Richter paintings, for instance, see Carbon [13]—self-chosen distances were also modulated by the size of a painting. We revealed a simple relationship between the size of an artwork and the self-chosen distance: the bigger the artwork, the farther the distance; actually, we found much larger distances than Locher, Smith and Smith [15]. Probably, the size of the artworks visitors watched in our study were much larger than those of the Locher et al. study. Many museums also restrict the physically possible minimum distance by physical or electronic barriers to prevent touching and penetrating the displayed artwork. In the given case of the Richter exhibition, such a physical barrier was installed about 75 cm away from the artworks [13]. This might be the reason why the mean minimal distance from artworks was about 1.45 m—a substantially larger distance than that used in most setups of research studies in the lab where the utilization of eyetrackers or conventional computer screens prevented distances larger than about 50-70 cm [e.g., 67 cm in 16].

Another aspect revealed by museum field studies was that visitors engage with artworks not always alone but with companions—Smith and Smith [17] revealed that one fourth of the visitors in the MET New York wandered around together with at least one other visitor. Such engagement necessarily alters the perception behavior. Whereas single persons might focus deeply on the artwork, socially interacting persons will convey their experiences, discuss their feelings or debate their evaluations with the others. These different behaviors seem to take different amounts of time: Whereas visitors attending the art gallery as singles viewed an artwork for 46.2 s in total, pairs took more time (53.3 s) and visitors attending as a group even employed 73.4 s per artwork. We observed that not only did group size have an effect, but that quality of groups played a role: although groups of people took the most time at artworks, this was only true if these groups consisted of individuals and not family members. In fact families were the most fast-paced attendance type of all, given an average viewing time of just 40.7 s [13]. Still, these extensive times illustrate the many opportunities to grasp different qualities in a museum than in a typical lab scenario where sometimes even the very restricted presentation times are automatically paced by the experimental program.

There are further factors which should be considered and seriously taken when approaching art epiphanizing. Among them, the sheer size of artworks in museums is often a big perceptual factor. Inspecting Picasso's mural painting *Guernica* from 1937—with a width of nearly 8 m—can never be emulated by a conventional computer screen, which is mostly used in art studies in the lab. Not only is the feeling of sublime destroyed by the reduction of size, the interactivity of the beholder with the painting is instantly lost when looking at *Guernica* from a narrow visual angle. Size

indeed matters with regard to art perception [15, 18]. The physical presence of an artwork in its full Gestalt further enriches the quality of experience. We can more holistically view the artwork when it is present in 3D as a true artefact, sometimes even by touching, smelling or hearing it (Carbon, 2016). But it is not only the size and the physical presence of a work of art that makes the difference: Mostly the status of an artwork as an original, as something authentic and as a unique work [19] of an artist is what creates the specific perception mode that potentially leads to art epiphanizing.

## Conclusion

To validly capture experiences is a challenge, to capture them while perceiving art is even more demanding. The main reason for this is that art experience is a highly complex and undefined process which combines strong cognitive and affective qualities. This process is multimodally triggered and is very much associated with previous experiences, expectations and knowledge. It might be possible to investigate some sub-phenomena and sub-processes using standard lab-based experiments, but devoted interest in artworks, fascination, and love for art [see for more art-related emotions and motivations 20], can only be validly addressed within the art gallery or within contexts that mimic their conditions. This is particularly the case if the aim is to research and understand deep art experience, which I term “art epiphanizing” within this paper. To be able to simulate such contexts, their key properties have to be known. The present papers shows that some of these properties which have to be addressed are adequate presentation conditions regarding the size of the stimuli, the distance to the stimuli and the possibility to choose the time needed to inspect and to re-attend them. Much harder to achieve is to emulate the sheer value and meaning of an original artwork [19]. If studies explicitly address prestige, authenticity or originality effects, then research has to be conducted within a real museum context [21]; if it is more about content factors [e.g., 22], the original museum context seems less important but still has to be taken into account.

Empirical aesthetics has a long tradition regarding the relatively short history of experimental psychology, but ecological valid studies are still quite rare and so knowledge concerning art epiphanizing is quite sparse [23]. I hope that future research will go back to museums or to naturalistic settings to investigate and understand the really fascinating experiences we potentially gain from artworks, these wonderful artefacts of human culture.

## In appreciation

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