

MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

Social reputation as a state influencing criteria

in aesthetic appreciation:

how testosterone coordinates the perception of beauty

verfasst von / submitted by

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angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree of

Master of Science (MSc)

Wien, 2017 / Vienna, 2017

Studienkennzahl lt. Studienblatt / degree program
code as it appears on the student record sheet:

A 066 840

Studienrichtung lt. Studienblatt / degree program
as it appears on the student record sheet:

Masterstudium Psychologie

Betreut von / Supervisor:

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(sadly passed away during collaboration)

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Acknowledgements

My acknowledgements are bound to a short story, which tells how I found myself in this topic: It was summer holiday, beautiful warm weather, and I was completely torn into my idea for studying long term effects of beta blocker. So, I spent some time, sitting in the sun in front of my university and reading articles. Helmut Leder, the empirical aesthetics professor at my university, saw me now and then, sitting at my spot and always greeting me kindly. Until one day he came to me and asked me, if I would be interested to find a way to bring empirical aesthetics and neuropharmacology together. So, my time in the sun in front of the university was expanded, remarkably, reading more articles, and questioning, where aesthetic experiences begin and experimental methods start to intervene.

My deepest thanks go to Helmut Leder, who has lead me into this topic and has motivated me to intensively deal with experimental methods, from set-up to measurement. He has taught me to dissociate and breakdown variables of influence, but always considering the limits of fractioning an experience, especially an aesthetic experience. He has always taken the time to order my thoughts, when my brain has been overloaded with information and ideas. He kindly has brought me back down to facts, when I have lost myself in my affection to interdisciplinarity and my affinity to scepticism. And I am looking forward to most entertaining and satisfying discussions and debates with him, as far as context allows this.

I have been connected to a research area, where beauty is not only the research field, but also a companion, when you find yourself stuck in an overload of information and emotion. It is remarkable, how well-doing such stimuli can be, always giving myself comfort. A comfort, which I started to realize, when I got the message, that my Co-Supervisor, Christoph Eisenegger, suddenly passed away during a trip to Namibia. Chris Eisenegger told me once, that in research, he was a child of economists. So am I. We understood each other on this basis and way of functional thinking of multiple variables. However, I never met a person, who grasp complexity and social interaction in the way he did. He transferred his intuition of social relationships into verifiable causal relations, catching this moment of interaction with the technique of quantifiable measures. As far as I can judge his work and study designs as such a young researcher, I must say, that his way in converting complex phenomena into experimental designs was always accompanied with some elegance.

I further would particularly like to thank the team of the Empirical Visual Aesthetics-Lab and of the Neuropsychopharmacology and Biopsychology Unit for their kind assistance with the handling of different measurement devices. I want to conclude my acknowledgements with my personal path and to have found a way to psychology and neuroscience, which has not been very easy, but also very entertaining. Hence, I am very grateful, to have the opportunity, to occupy my mind with the appealing and challenging questions in the fields of empirical aesthetics, neuroscience and neuropharmacology and hope, that my circumstances allow me, to further maintain this path.

Introduction

In the past two decades, a number of researchers have sought to examine aesthetic appreciation in the human brain (Berlyne, 1971, 1974; Fechner, 1876; Leder, 2013; Pelowski, Markey, Luring, & Leder, 2016). This research area is synthesized in the field of empirical aesthetics, a well-established field on the edge between psychology, art history and art sciences (Leder, 2013; Leder & Nadal, 2014; Pearce et al., 2016). Herein, neuroscientific research has become a key instrument for the methodological set-up of experiments. This thesis critically traces, how existing neuroaesthetic methods—an interdisciplinary approach of neuroscience and psychology—enable to investigate the perception of an art object and interpret the experimental data, gained by such studies. Therefore, we will start to review research conducted in experimental aesthetics and comment on the methods used in the research field. To focus this review, aesthetic appreciation is placed into the context of a decision-making process, in which behavior and aesthetic judgments are created, maintained and renegotiated to tie to an aesthetic experience. Throughout the thesis, the main question is concerned with the *evaluation of an aesthetic object*. Here, we consider evaluation as a kind of decision-making process, aiming for an aesthetic judgment. Hence, evaluation is viewed as a prerequisite, enabling a *valuation of an aesthetic stimulus*. Therefore, the theoretical and methodological review will focus on those variables, and question current empirical research methods. By reference to this theoretical and methodological discussion, we will suppose, that a system-oriented approach is better suited for investigating the information processes occurring during an evaluation of an aesthetic experience (chapter: Neuroaesthetics and its boundaries in capturing aesthetic experiences). We intend to take this system-oriented approach up, by introducing neuropharmacological research and used empirical methods in this research field (Eisenegger, Haushofer, & Fehr, 2011; Eisenegger, Naef, Snozzi, Heinrichs, & Fehr, 2010). In consequence, we suppose a new interdisciplinary cooperation between empirical aesthetics and neuropharmacology, to investigate the perception of aesthetic objects and aesthetic experiences.

The theoretical discussion, intends to deliver an understanding, how aesthetic judgements are created within a perceiver. Those judgements are measurable effects of art appreciation and can be quantified by valuation measures, such as liking, elicited emotions, arousal or comprehension of an artwork (Leder, Gerger, Dressler, & Schabmann, 2012) or by preference (Reber, Schwarz, & Winkielman, 2004). In this thesis, *context* is argued to be a main influence during the evaluation process of an art object. Hereby, questions are raised about, in what way and to what extend the surrounding context, but also the object's and the perceiver's environment, are interacting, assuming, that these contexts moderate or directly influence art evaluation. This increas-

ingly important topic in empirical aesthetic studies will be discussed in detail in chapter 'functional perspective of an aesthetic experience embedded in context.'

In this thesis, two main theoretical approaches are taken up, emerging from the decision-making process perspective: First, the whole aesthetic experience is understood as a functional relationship between the art object and the perceiver (Bourdieu, 1985; Eco, 2016; Dewey, 1980). A philosophically perspective considers: what is art, where can art be found, when does art become a communication medium, what kind of interaction must occur between object and recipient, that the object is judged as being aesthetically valuable for the perceiver (Liessmann, 2009; Bourdieu, 1985; Dewey 1980)? These considerations, if looked at in a teleological and analytical way, inevitably redefine the scientist's perspective into the function of the meaning of 'art' itself. The quality of art can no longer be seen in its pure and static existence (being just a factor or—a valuation), but focus on its function as an object initiating and catalyzing the transition of a person from a neutral state into an emotion of aesthetics—an evaluation process. An aesthetic experience, in this understanding, is no longer just a static state, but the iterative process between subject and art that leads to this state. This notion highlights, why a separation of valuation and evaluation in aesthetic experience is necessary, because the examination of these variables lead to methodological consequences regarding determined variables and experimental set-up.

Therefore, changing or manipulating this function of the art object for the perceiver, should influence the relations between the variables involved in the whole decision-making process of the aesthetic percept. This modification in information, emerging from processing the experience, further alters the evaluation process and leads to different outcomes, respectively aesthetic judgements. These are valuations of the aesthetic experience and are measurable effects of the decision-making process.

In general, the psychological point of view, looks at this functional relationship between recipient and an aesthetic object, by describing an aesthetic experience as a multimodal information-process (Cela-Conde et al., 2013; Leder, Belke, Oeberst, & Augustin, 2004; Leder & Nadal, 2014; Nadal & Pearce, 2011; Pelowski et al., 2016). Here, an aesthetic experience is specified by different dimensions, like evaluative, affective and semantic dimension (Chatterjee, 2003; Pearce et al., 2016; Zeki, 1999), and information-processing approaches describe the processing stages involved (Cela-Conde et al., 2013; Leder, Markey, & Pelowski, 2015; Pelowski, et al., 2016; Vartanian & Nadal, 2007). In addition, research in empirical aesthetics examined several dependent variables regarding contextual manipulation during an aesthetic experience and measuring the change in the outcome with variables concerning aesthetic appreciation and judgement (Brieber, Leder, & Nadal, 2015; Flexas et al., 2013; Forster, Gerger, & Leder, 2015; Gerger & Leder, 2015;

Gerger, Leder, & Kremer, 2014; Leder, et al., 2012; Huang, Bridge, Kemp, and Parker, 2011; Kirk, Skov, Hulme, Christensen, & Zeki, 2009).

Those research findings lead to the second approach, which intends to change the function for the recipient by concentrating on the contextual influence, as an independent variable, intervening into the evaluation process. Both approaches, the function for the perceiver as well as the contextual influence on a measurable variable, are taken up to exemplify two study designs. The two study-designs will focus on *social reputation* as a context (independent) variable, which we assume can change the function for the perceiver. Therefore, in the section ‘Social reputation as a state influencing criteria in aesthetic appreciation’, social reputation as a kind of social status will be defined and dissociated from other similar constructs (Barclay, 2010; Berger et al., 1972; Blader & Chen, 2014). Social reputational influences have already been investigated in empirical aesthetics, but more in the terms of an aesthetic status and familiarity with artworks and artists (Gerger & Leder, 2015; Leder, 2013). In neuropharmacological research, social status manipulations are often applied, using classical and updated versions of economic game theory paradigms (Eisenegger et al., 2010; Kopsida, Berrebi, Petrocic, & Ingvar, 2016; Newman, Sellers, & Josephs, 2005). In those studies, testosterone, as one major hormonal messenger, as well as other neuro-modulators (such as dopamine), have been associated with social status behavior. This behavior can be measured with methods controlling status seeking and status maintaining of a person, studying correlative as well as causative relationships with neurochemical baselines and modulations within the same person. Therefore, we will argue, that the supposed system-oriented approach for empirical aesthetics research can be facilitated by using neuropharmacological methods for future studies, facilitating new foci and perspectives for studying aesthetic perception and aesthetic appreciation.

The field of empirical aesthetics in psychology aims to understand, why people are stimulated by aesthetic objects, like artworks, but also by other aesthetic stimuli in daily life. As Liessmann (2009) noted, aesthetics has broadened its relevance into everyday life, as being a relevant activating tool for the human mind and for decision-making processes in general. Pelowski et al. (2016) brings it to the point and describes art as an ‘[...] *omnipresent part of human life*’. Accordingly, research in aesthetics seeks to contribute in understanding the human mind, its processes and, with the restrictions of today’s technologies, tracing its influencing variables (Leder et al., 2004; Leder & Nadal, 2014).

Structure of the thesis

The thesis is organized into a theoretical, a methodological part and an empirically oriented part. The latter delivers two propositions for study designs, based on the discussed theoretical

arguments. Hence, the thesis will start with the theoretical background, which reviews the existing models and dimensions considered important in aesthetics, neurobiological frameworks of aesthetic experiences, as well as some empirical evidence in the field of empirical aesthetics. Here, especially evaluation and valuation are described and how those variables are embedded in contextual mechanisms in an aesthetic process.

In the third section (Methodological Background) some problems in current neuroaesthetic research are discussed. Based on the described nature of the research interest—the evaluation of an aesthetic object—we claim, that the evaluation processes need a system-oriented approach. It will be argued, that on the one hand the neurobiological foundation of an aesthetic experience is created alongside neurochemical systems. On the other hand, the whole information-process, seen as a functional system between the perceiver and contextual influences, will also lead to consequences on the behavioral level. As most empirical studies pursue the manipulation of an effect, it is therefore highlighted that the nature of a research object and the examined variables should be clarified beforehand; this will also be elaborated regarding evaluation and valuation.

We follow our argumentation of contextual influences with a function-oriented approach and introduce social status and social reputation as context variables (Social reputation as a state influencing criteria in aesthetic appreciation). After the review of research in empirical aesthetics and neuropharmacology, with a focus on social status and social reputation, we propose our study designs in the following sections (Proposals for study designs focusing on social reputation). The last section (Discussion and implications) will give a résumé of the addressed theoretical and empirical considerations, discuss some critical questions concerning the research field and its limitations, and attempt to maintain some future implications.

Theoretical Background

Down to the present day, Gustav Theodor Fechner's *Vorschule der Aesthetik* remains a deep ingrained reference book in experimental aesthetics (Fechner, 1876; Jacobson, 2006). Fechner highlighted in his work the importance and necessity of the inner psychophysics, seeking for measurement methods able to quantify sensory and neuronal physiological activity. However, technological developments change, enable and evolve research and research areas. Thus, it appears that past verified results lose relevance in the present experimental interest, such as the *ästhetische Schwelle* no longer seems an object of research in empiricism anymore; likewise, effects are reinterpreted and certain paradigms disappear. Following Fechner's work came the *Gestalt* approach, concentrating on the perception of art and aesthetics with the Gestalt laws (Arnheim,

1966). The Gestalt laws highlighted the importance of the perception analysis during aesthetic experience, also focusing on the early vision stage of visual aesthetics, and viewing art and aesthetic objects based on their elements, for instance lines, colors, symmetry, contrast, among other variables. Although, artworks seem to have a specific compilation of stimulus elements, aesthetics cannot be reduced only to those elements and to shapes of the art object. The artwork exists not on its own, but seems to be an act of congeniality (Eco, 2016). Nevertheless, these specific stimulus compilation triggers a processing activity in the brain, and lead, after the evaluation of extrinsic and intrinsic parameters, to a judgement of being something aesthetic (Leder & Nadal, 2014). This process is accompanied with an aesthetic emotion—stating the highly obligatory physiological element during an aesthetic perception. This leads us to the later influencing work in experimental aesthetics, the seminal writings of Daniel E. Berlyne in the 1960's and 1970's (Berlyne, 1971, 1974). Berlyne's psychophysiological framework highlights the influence of the emotional affective state and the anticipation of arousal, suggesting an inverted U-shape relation between so-called collative variables (such as novelty) and aesthetic appreciation.

Zeki (1999) in his discussion about art and the brain, noted the connection between the functions of art and the functions of the visual brain, viewing famous artworks; he also described differences between abstract and representational visual artworks with a highly neurobiological perspective. He summarizes, that visual artworks in the end are a communication tool, which is understood between humans without the needs for words, so there should exist some general processing in the brain in all humans, which can actual be found. To put in another way, although ambiguity cannot be caught, the complexity behind the information process, during an aesthetic experience, someday can probably be understood.

Aesthetic experience: evaluation as a pivot point in processing aesthetic information

Leder et al. (2004) proposed a psychological model of aesthetic appreciation with the potential outcome of cognitive and affective judgements of the perceiver. In their model, an aesthetic sensation runs through several processing stages—perception, implicit memory integration, explicit classification, cognitive mastering and evaluation resulting in the valuation of the aesthetic object, seen in the *aesthetic judgement* and the *aesthetic emotion*. The whole process is embedded in influences of social interaction and discourse, context of the artwork placed, a possible pre-classification of the object and the emotional state of the perceiver (see Figure 1).

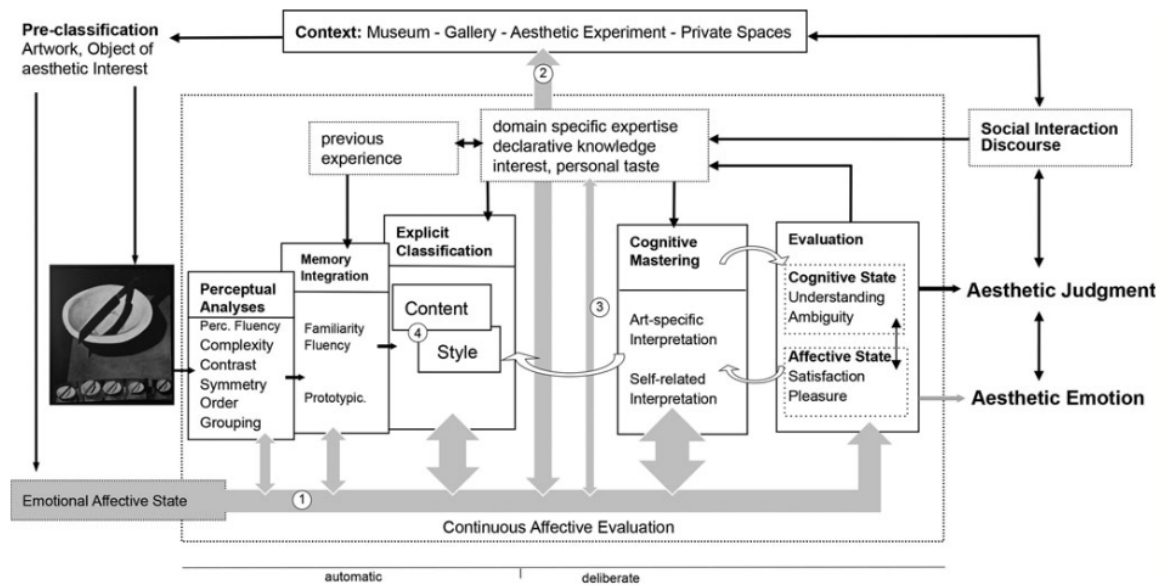


Figure 1. Model of aesthetic experiences (Leder & Nadal, 2014; adapted from Leder et al. 2004)

Evaluation is here a pre-stage just before an aesthetic judgement and could therefore be viewed as the pivot point: the point where all the information gathered determines the direction of the judgement, but flexible enough to twist the direction of an effect, if some new information turns the perception of the aesthetic experience. Leder and Nadal (2014) illustrate an aesthetic experience in a process-oriented model and mention in their update of the model of aesthetic appreciation (initial model published in Leder et al., 2004) two kinds of evaluation processing stages—a continuously ongoing emotional evaluation, and the evaluation stage, where the cognitive and the affective state are assessed to achieve an overall aesthetic judgement about the experience. The postulated dual outcome suggests a separate valuation of cognitive and affective nature, although—and this is also highlighted by the authors—the affective part is a chronic influencing variable, not separable from any cognitive activity and vice versa. However, even if those systems (cognitive and affective) are intertwined, people often feel a separate valuation—introspectively and also seen on the behavioral level. Hence, art viewing can lead to very positive feelings (such as astonishment, sublime, harmony, being activated) (Pelowski, 2015) or to negative emotions (like aggressiveness, being depressive, feeling sad) (Silvia & Brown, 2007). This, seemingly independent from a cognitive judgment, for instance like or dislike, artistically importance, ugliness or beauty. Artworks can lead to myriad, even mixed, emotions, evoke personal associations, physiological reactions and can have behavioral effects (Berlyne, 1974; Pelowski & Akiba, 2011; Pelowski, 2015; Jacobson, 2006; Pelowski, Markey, Forster, Gerger & Leder, 2017 in press). It seems, that each combination of cognitive and affective valuations—seen in the effects of this experience—are possible, subsumed in the ambiguous perception of an aesthetic experience (Jakesch & Leder, 2015). And even the ambiguous perception can adhere to just one system:

for example, an artwork can lead to a clear positive emotion but result in cognitive ambiguities. These are often found in surrealistic visual artworks (Jakesch, Leder & Forster, 2013).

An emphasis on early, especially visual, perception has been made by Chatterjee (2003, 2004, 2010, 2011 see Cela-Conde, Agnati, Huston, Mora, & Nadal, 2011 for review) and, at least in the first stage of the model, by Locher, Overbeeke, and Wensveen (2010; first discussed in Locher, 1996). Chatterjee (2003) describes evaluation in his work as something evoking from the aesthetic experience, whereas Locher et al. (2010) delineate the evaluative judgement and evaluative meaning of the aesthetic experience as an outcome of the process. In Locher's model, the evaluation process is starting from the first moment of capturing the visual input and is updated constantly in the intermediate stage through eye movements, getting informational input from fixations and saccades. This aesthetic visual information process is embedded in the artifacts and the personal contexts. In Locher's et al. (2010) model, an attraction of an artwork is defined through its functional relation to its perceiver, viewing the information process as a network system of meaning, action and appraisal; additionally, their model embeds all kinds of contexts completing their understanding about the aesthetic visual information process: the context of the artifact, of the person and the environmental context (see Figure 2).

Interestingly, Locher's work considers the perception change over time in the scope of design from human/artifact interaction and brings the functionality of the product (aesthetic object) into the focus of an aesthetic experience. This functionality is embedded in the environmental context, which respects variables of societal values, as well as social-cultural and socio-economic factors related to an aesthetic object; it further includes the economic value of an art object described by marketing programs and its sell prices. Locher's model incorporates symbolic associations (such as price) and the social value (for instance influences by group membership) as well as social-cultural, artistic values (for example historical significance) in general.

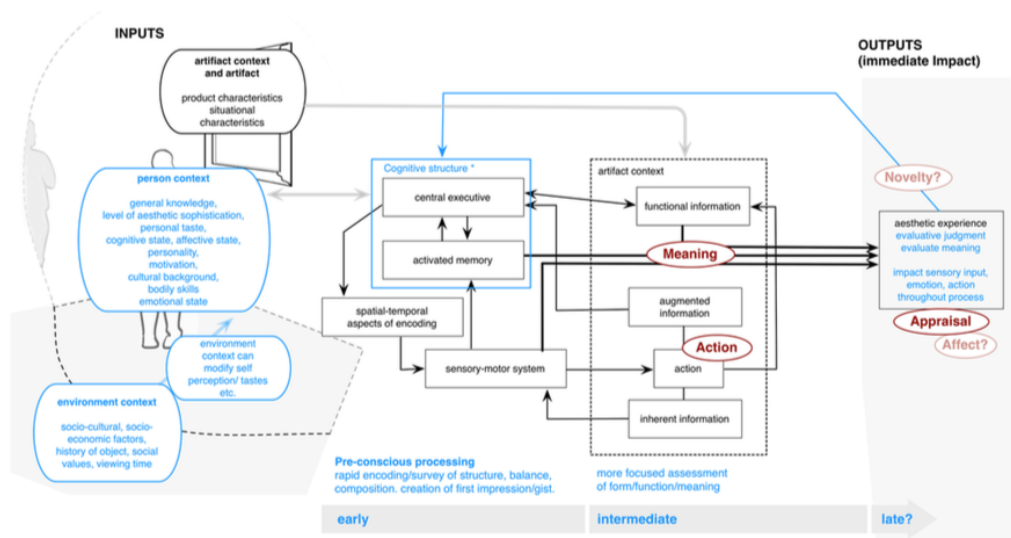


Figure 2: Locher model adapted from Pelowski et al (2016) based on Locher (1996) and Locher et al. (2010)

Pelowski et al. (2016) suggest in their review, that a discussion of action/eye-movement, with evaluation or emotion, would be a useful implication for Locher's model for future studies. In the section 'Proposals for study designs focusing on social reputation' we will exemplify two studies, which focus on contexts—artistic as well as economic contexts—as independent variables measured with eye-movement pattern analysis and behavioral effects.

Silvia (2005a,b) appraisal theory centralizes evaluation as a pivot point for aesthetic appreciation and argues that each aesthetic emotion originates from a specific set of evaluations. The author notes, that the evaluation process is nourished by its context and individual influences, leading to the assumption, that evaluation, not the aesthetic object, is cause of the aesthetic appreciation. Under these circumstances the question comes up, if valuation is just a byproduct from context, individual traits and states, and of a trigger (the aesthetic object); hence, the actual appraisal is originated in the evaluation process—the activity of the mind interacting with information. This view on an aesthetic experience reminds of Dewey's (1980) perspective of art as an experience, in which the research goal is to understand '[...] *what experience actual is*'. He stated that the essence and value of art is not in artifacts per se, but in the '[...] *dynamic and developing of experiential activity through which they are created and perceived* [...]' (Shusterman, 1997, cited from Dewey, 1980). Silvia (2005a,b) gives therefore a thought-provoking impulse to the question: 'to what degree does context create perceptive ambiguity and in consequence determines valuation?'

These perspectives about focusing on the recipient's presence, their self-image and about the ambiguity seen as an informational well, heads the way to Pelowski's and Akiba's model (2009, 2011), which arose from Leder's (2004) model of aesthetic appreciation. Their focus on aesthetic experience as an epiphany, questions the depth of this experience, by arguing that evaluation has a circular character, leading to an evaluation and re-evaluation of the aesthetic experience. This circularity will precede, until a classification and a way of evaluating the experience is maintained, in order to come to a meaning of this percept. Furthermore, Pelowski's and Akiba's (2011) model stays in harmony with Liessmann's (2009) attempt on understanding aesthetic perception. Liessmann claims, that an aesthetic object, whatever form and nature it takes, must be noticed with a specific, fine and distinguished sense; that means, an aesthetic percept can be fluent or exhausting, disturbing or relaxed, in either way the aesthetic object differs from other surrounding stimuli. In Pelowski et al. (2017 in press) this approach is continued: here it is argued, that the aesthetic process leads to a coherent meaning, based on bottom-up (such as perceptive, physiological factors) and top-down processes (like cognitive mastering and knowledge), which leads to an appropriate evaluative and physical reaction. Their perspective substantiates contextual influences as probable reasons to show a proper, for the perceiver functioning or successful, response of the aesthetic experience.

frameworks and dimension in aesthetic experience.

Jacobson (2006) describes mental aesthetic processing via a framework of seven different vantage points, including many of the processing stages mentioned in the theoretic models above. There are variables of individual differences, likewise social and cultural processes, situation dependent scripts and schemata, and, above all, the influence of the mind, uniting cognition, emotion, attitudes and prototypes. Although the framework does not include the processing element of evaluation, the author notes, that aesthetic processing is a sensation-based evaluation of an entity—like an aesthetic object. There are two other frameworks describing an aesthetic experience—not through a process-oriented model but through dimensions. On the one hand, the aesthetic triad from Chatterjee and Vartanian (2014) and on the other hand the dimensions of aesthetic experience from Pearce et al. (2016). An already adapted, combined version of both frameworks is shown in Figure 3.

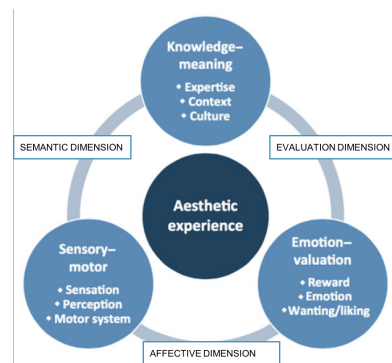


Figure 3. Dimension of an aesthetic experience. Aesthetic triad described by knowledge meaning, sensory-motor and emotion-valuation (Chatterjee & Vartanian, 2014); dimensions of an aesthetic experience: semantic, affective and evaluation dimension (Pearce et al., 2016). Both frameworks are combined in a complementing way, in which the dimensions describe the relations of the triad.

Pearce et al., (2016) underline the relevance of a *cognitive view* in neuroscience and neuroaesthetics, and describe three dimensions, which were first mentioned by Shusterman (1997). The *affective*, also defined as *phenomenological dimension*, circumstances the subjectively felt sensation part of the aesthetic perception, whereas the *semantic dimension* gives the meaning to the experience. The *evaluative dimension* includes in this approach only the fact, that just a valuation of an object takes place. Pearce et al. (2016) do not draw further intention to the evaluation part.

functional perspective of an aesthetic experience embedded in context.

The main purpose of this thesis is to develop an understanding of aesthetic appreciation from a functional perspective, by focusing of the evaluation process of the information given from context. As Locher et al. (2010) suggest, there are three scopes of context: (a) the *personal context* characterized by traits and states of the perceiver; this personal element is also supported by the emotional affective state of the person, interest, expertise or past experience in Leder's et

al. (2004) model or Pelowski's and Akiba's (2011) self-image; (b) the *artifacts (artistic) context* described by the aura of the artwork (Benjamin, 2010; Bourdieu, 1985); further, the artist standing behind the artwork (Belke, Leder, Harsanyi, & Carbon, 2010); additionally, Leder's et al. (2004) pre-classification and context understanding of the present localization of the artwork (Brieber et al., 2015) can be included here, among other artworks dependent variables like title etc. (Gerger & Leder, 2015; Gerger et al., 2014); and (c) the *environmental context* including social-cultural, socio-economic (also described by Eco, 2016 and Liessmann, 2009) and interpersonal social influences (for example study of Pelowski, Liu, Palacios, & Akiba, 2014).

For this approach, Leder's et al. (2004) model was graphically adapted and supplemented with Locher's et al. (2010) and Pearce's et al. (2016) theories (see Figure 4). The endpoints of Leder's model, described as the effects of an aesthetic experience—aesthetic judgement and aesthetic emotion (see ellipses top and down)—were pulled apart to highlight the semantic (blue) and affective dimensions (orange) and their steady influence into the evaluation dimension (black description left side). The artistic context of the aesthetic object becomes the object of interest during an aesthetic experience (inner cylinder, description on the right side). During the process, the personal context encloses the aesthetic object and its context, not by changing it, but by staying in an interactive communication process with each other. The perceiver in his personal context uses the aesthetic object as a stimulus of some value (big cylinder, description on the left side). The value could be of high informational and/or of a deep affective value, leading to all kinds of effective responses from the perceiver (marked by the arrows on the left side). Overall lies the environmental context (description right upper corner), able to influence the whole evaluation process and even able to shift the outcome (aesthetic judgement and emotion).

On the personal level, as described by Pelowski et al. (2017 in press; firstly, by Pelowski & Akiba, 2009), an aesthetic experience can completely change the state of a person, even creating long-term effects of the nature of interaction with art. For that reason, the cognitive and emotional state was included twice in the adapted model—in the personal context (as a pre-stage of the personal context) and in the evaluation stage (as a peri-stage).

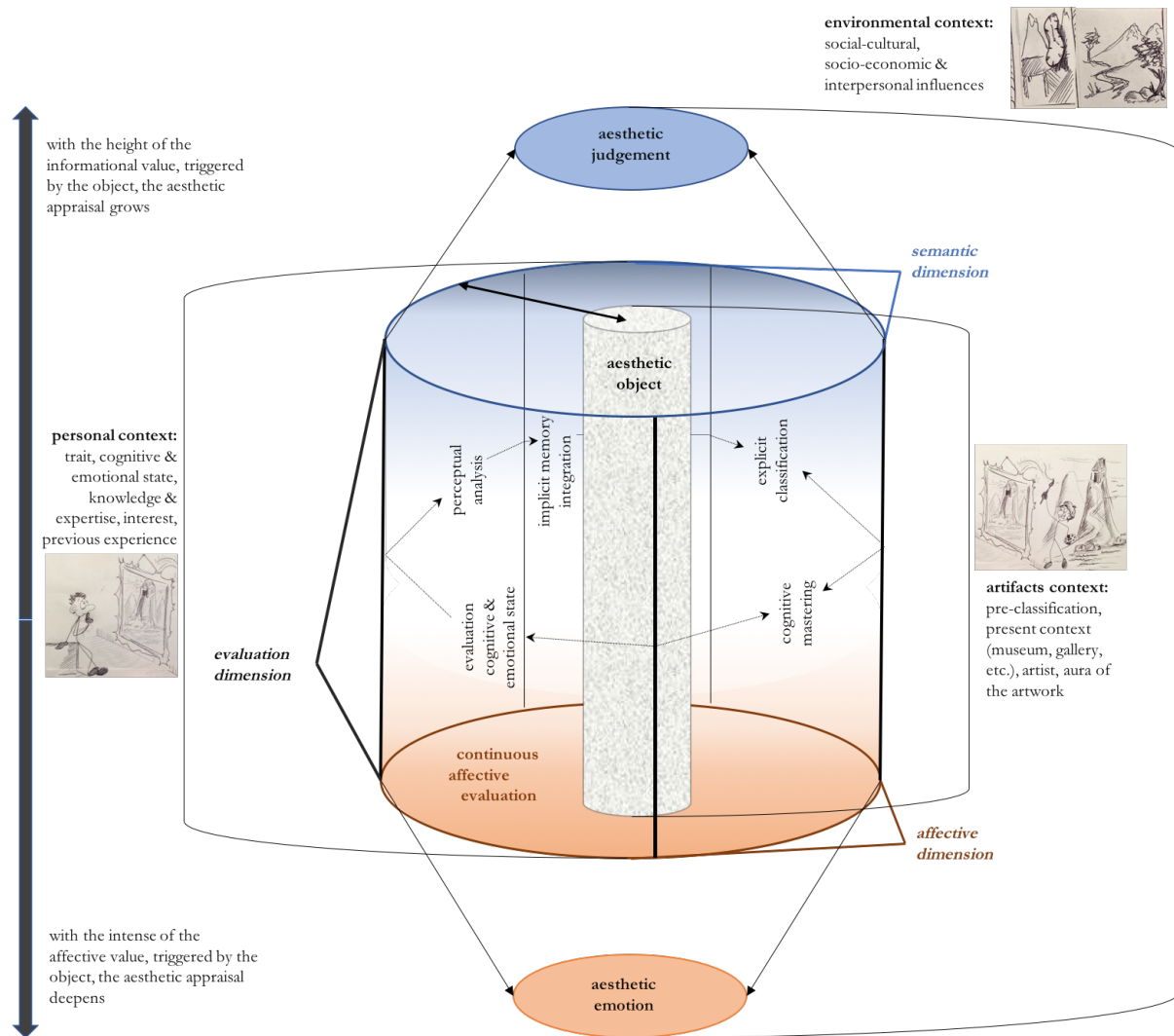


Figure 4. Functional perspective of an aesthetic experience. Adapted version of the model of aesthetic appreciation from Leder et al. (2004), respectively Leder and Nadal (2014), embedded in Pearce's et al. (2016) aesthetic dimensions and in Locher's (2010) contextual influences. Adapted by BS.

Further, it should be noticed, that the three-dimensional illustration of Figure 4 was chosen to facilitate the graphical inclusion of context and dimensions. Aesthetic judgement and aesthetic emotion are still intertwined and describe measurable effects of the evaluation process during an aesthetic experience. Likewise, the height of the informational value and the intensity—or depth—of the affective value are not two diverging systems, but figuratively delineate, why the measurable effect of an artwork can be similar, yet still felt completely different. The relation between information and affective value can assume myriads of combinations all serving aesthetic appraisal. This illustration also explains why artworks can be just boring, because without height or depth, the value for the appraisal and for the perceiver is just too small. At last, it describes why on the one hand, some artworks are beautiful, because they tease a cognitive challenge (plus in informational value), and some aesthetic objects are so intensively arousing, although they are cognitively easy to digest (plus in affective value).

Methodological Background

Is evaluation a cause or an effect, or both? The theoretical review in the previous section does not give a clear answer to this question. Leder et al. (2004), respectively Leder and Nadal (2014), as well as Locher et al. (2010) give evaluation a more causative character, leading to judgements, meanings and emotions, which describe the effects in their models. Chatterjee (2003) and Silvia (2005a,b) connect more to the ideas of Dewey (1980), who defines the evaluation process as the appraising element. Likewise, Pelowski and Akiba (2009, 2011) and Pelowski et al. (2017 in press) delineate the experience as the appraising origin, connected with the informational flow between aesthetic object and perceiver. However, they noted, as well as Silvia (2005a, b) the relevance of valuation, respectively creating a meaning of the experienced aesthetic appraisal.

Based on the current research results, it seems that evaluation can be both: On the one hand, the evaluation of the ambiguous stimuli of an aesthetic object, therefore the act of congeniality itself, is the appreciating element in an aesthetic experience—the flow of information activating the mind and maybe delivering the perceiver a form of satisfaction (Eco, 2016; Dewey, 1985; Pelowski & Akiba, 2009, 2011, Pelowski et al., 2017 in press). The work of Vessel substantiates, on a neurobiological level, the definition of the evaluation stage being an effect (Biederman & Vessel, 2006; Vessel, Starr, & Rubin, 2012; Vessel, Starr, & Rubin, 2013). His research found connections to the appreciation of an aesthetic experience and the *default-mode-network* (DMN) in the brain—a highly self-related neurological network, normally activated during awake resting periods. Therefore, evaluation is already the anticipated pleasurable element, the motivator and the effect of the aesthetic experience. Displayed in Figure 4, the evaluation dimension, influenced constantly by the semantic (blue) and the affective (orange) dimensions, is described by the information process within the artifact's and the personal's contexts. Here, it is figuratively shown that evaluation could already be an effect (outcome) of an aesthetic experience.

On the other hand, evaluation is also a cause of potential effects being a product of the evaluation process, triggered by an aesthetic event. Under this perspective, a valuation takes the position of an effect of an aesthetic experience; evaluation becomes the cause and the pivot point for a judgement. During the evaluation process both systems, the cognitive and the affective system, are involved. The effect of the process is a valuation of the art object in the environmental context (see Figure 4). It should be noted, that the environmental context circumstances the complete experience. Furthermore, the aesthetic experience is described by the height of the information value and the depth of the affective value, having an impact on the aesthetic appraisal. This notion of valuation being a product of evaluation, embedded in the environmental context, displays, why changes in environmental context can influence the whole process and alter judgements: even a small change in context can change the ratios between the information processing

stages and the dimensions. The alterations in the process change therefore the function of the process, leading to a modified processing in the brain. The art object or the aesthetic experience fulfills, dependent on context, the convenient function for the receiver; this makes the art object to a commodity item and art appreciation to a highly egocentric mind activity.

These assumptions imply, that clarifying the character of evaluation (being a cause or an effect) in an experimental design is necessary; since, the chosen method, establishing causal or correlative relations, differs, dependent on the kind of variable; in consequence, the study designs should be build alongside the variable examined. Before we introduce our propositions for the study designs, a short review of neuroaesthetic research is delivered. Based on the previous theoretical arguments, we will discuss, that empirical aesthetics would benefit from a system-oriented approach for studying aesthetic perception with neuroscientific methods.

Neuroaesthetics and its boundaries in capturing aesthetic experiences

A more recent attempt in empirical aesthetics is neuroaesthetics, an interdisciplinary approach of neuroscience and empirical aesthetics, which tries to find neurobiological correlates for the multifaceted perception of art and aesthetics (Pearce et al., 2016; Pelowski et al., 2016; Zeki, 1999). There have been several attempts in neuroaesthetics to correlate brain areas with the physiological and psychological reaction of art and aesthetic appreciation (Boccia et al., 2016; Brown, Gao, Tisdelle, Eickhoff, & Liotti, 2011; Cela-Conde & Ayla, 2014; Vartanian & Skov, 2014).

In the following a short review of the results found in neuroaesthetics research is provided: in general, brain activity for aesthetic appraisal has been found in striatum (Str), amygdala (Am), parahippocampal gyrus (PHG), insula, orbitofrontal cortex (OFC), anterior insula (AI) correlated with pleasantness scales (Brown et al., 2004; Koelsch et al., 2015). Aesthetic appraisal for visual artworks, like paintings, seems to be related to activation in caudate nucleus (CN), OFC and anterior cingulate cortex (ACC) (Vartanian & Goel, 2004; Kawabata & Zeki, 2004). The meta-analysis by Brown et al. (2004) showed brain activity for visual modality in OFC, ACC, AI, ventral region of basal ganglia, left inferior parietal lobe (BA40), fusiform gyri bilateral (BA 19/37), interior frontal gyri bilateral (BA44), hypothalamus, CN and amygdala (Am) bilateral. Cela-Conde et al. (2011) listed the most mentioned brain areas of twenty studies, which were occipital cortex, ACC, anterior medial prefrontal cortex (amPFC), hippocampus, OFC, ventral Str, insula, ventrolateral PFC, motor cortex, dorsal Str (caudate), precuneus, Am, superior and inferior parietal cortex; the posterior parietal cortex (PPC) and occipital regions are involved in visual art perception and spatial processing (Cattaneo et al., 2014b; Cela-Conde et al., 2013).

Focusing on the evaluation of an aesthetic experience, Skov's and Nadal's (2013) review characterized the brain areal involvement alongside the processing of information. Here, percep-

tual processing included the superior occipital gyrus and the fusiform gyrus (among others), the reward processing was assigned to the OFC-regions and the cingulate cortex and executive processing to several prefrontal areas. The involvement of OFC, PFC and ACC areas suggest cognitive processing during evaluation, as in Leder et al. (2015). Additionally, Ishizu and Zeki (2011) concentrated on frontal areas, especially the medial part of the OFC. Activity in this area was positively correlated with the intensity of the participant's stated experience of visual and musical beauty. Based on their found evidence, the researches even formulated a brain based definition of beauty: the strength of activity in the medial OFC represents the level of beauty experienced by a perceiver. The involvement of frontal regions is also highlighted by Vartanian and Skov (2007), who related the DLPFC during decision-making processes in aesthetic judgements. Additionally, they noted that decision-making is based on perceptual as well as affective information. Prefrontal areas, especially the left dorso-lateral prefrontal cortex (DLPFC), seem to have a crucial role in the evaluation of aesthetic preferences. Activation in frontomedial cortex, lateral OFC, inferior frontal gyrus, posterior cingulate, temporal pole, temporoparietal junction for aesthetic judgement was examined by Jacobson et al. (2006). Skov and Nadal (2013) divided the involvement into perceptual processing with superior occipital gyrus, fusiform gyri amongst other activation. For the affective component, activation in CN, OFC and ACC of paintings was listed in Vartanian and Goel (2004) and Kawabata and Zeki (2004) for aesthetic appreciation; further reward processing was related to OFC, cingulate cortex and CN activation and executive processing with prefrontal area involvement.

Results of these studies show the difficulty in reducing art perception to area-specific involvement, because the processes during art and aesthetic perception activate a broad network of cortical and subcortical areas in the recipient (Cattaneo et al., 2014a; Cattaneo et al., 2014b; Chatterjee & Vartanian, 2014; Chatterjee & Vartanian, 2016; Cela-Conde et al., 2004; Leder et al., 2015). Discussions on a theoretical level about the neurobiological underpinnings of the information processing of aesthetic objects (Leder, 2013; Chatterjee, 2014; Nadal & Pearce, 2011; Pearce et al., 2016), emphasize that an art object can initiate several affective and cognitive systems of the recipient, interacting with his dispositional biological systems (Boccia et al., 2016; Brown et al., 2011; Cela-Conde & Ayla, 2014; Vartanian & Nadal, 2007; Vartanian & Skov, 2014; Zeki, 1999).

A theoretical comparison, with focus on the affective dimension, is introduced in the commentary of Leder et al. (2015), where Koelsch' et al. (2015) affective systems (brainstem-, diencephalon-, hippocampus- and orbitofrontal-centered system) are allocated on the model of aesthetic appreciation and judgement (see Figure 5).

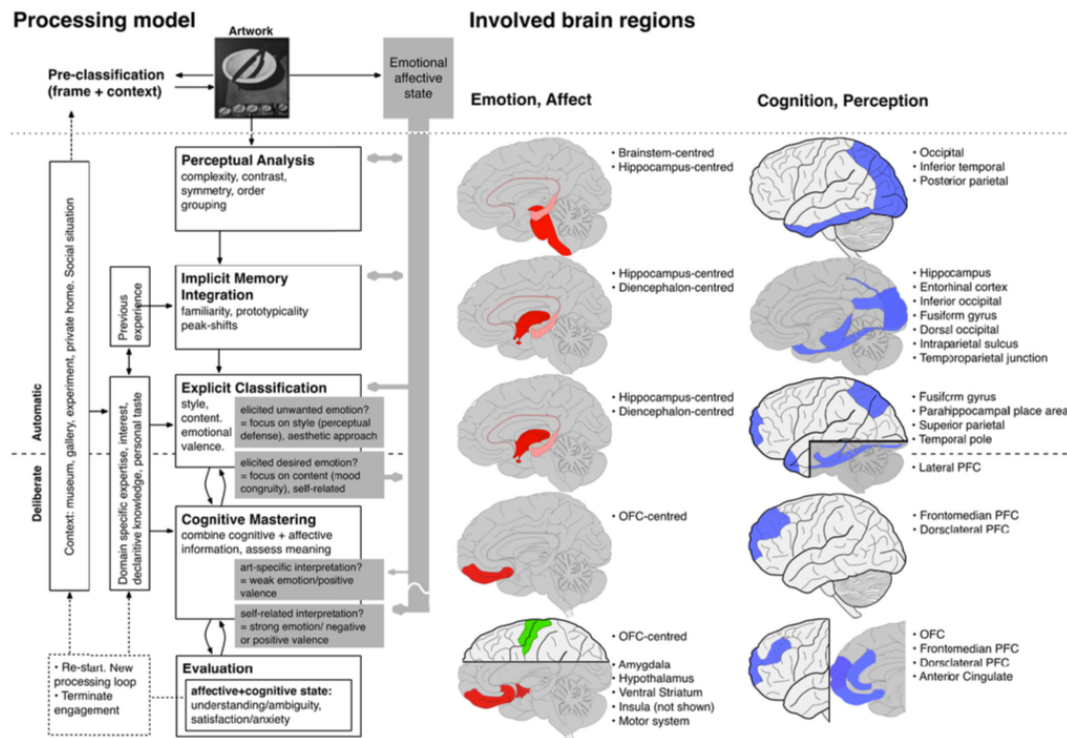


Figure 5. Mapping of Koelsch's et al. (2015) affective systems on the processing model based on Leder et al. (2004; respectively Leder & Nadal, 2014), by Leder et al. (2015)

The approach by Leder et al., (2015) differs from the empirical research in neuroaesthetics reviewed above, by elaborating the neurobiological mechanisms of an aesthetic experience in systems rather than brain areas. As already mentioned above, the dissociation of the affective and cognitive system (shown in red, respectively in blue) is a common way of illustrating those two dimensions. However, those systems influence each other also on the neurochemical level. Research in neuroaesthetics, following a system-based perspective rather than focusing on areas, are mainly concerned with the affective side of the process. Three neurochemical systems have been related to aesthetic appreciation: the opioidergic, the cannabinoid and the dopaminergic neuromodulatory systems (Chatterjee, 2014b; Pearce et al., 2016, Skov & Nadal, 2013). Alongside those systems, there is an ongoing discussion about the lack of the motivational drive of acting during an aesthetic experience (Chatterjee, 2014b), concluding a stronger involvement of the opioidergic and cannabinoid systems rather than the dopaminergic system. Liking is a known semantic construct in empirical aesthetics, however, wanting is still a vague construct in meaning as well as in aesthetic research. A closer look on the assignment of both theoretical constructs, liking and wanting, and found correlation with the mentioned neuromodulatory systems will be conducted in the chapter 'Liking and wanting in art and aesthetics'.

The work of Vessel et al. (2012) was already mentioned regarding evaluation as being an effect (outcome) of the aesthetic experience; their work about the DMN also ensues a system-oriented approach. Here, the aMPFC was identified as a possible 'gateway' to the DMN, '[...] sig-

*nal*ing personal relevance and allowing for a heightened integration of external (sensory/ semantic) sensations related to an art object and internal (evaluative/ emotional) states'. Furthermore, the striatal involvement was not only related to anticipation of reward (reviewed by Pearce et al. 2016), but rather as being sensitive for both, emotional and evaluative factors. Therefore, striatal associations exist during perception, evaluation and reward in coordination with the cortico-striato-pallado-thalamic loops. Vessel et al. (2012) furthermore dissociates dorsal from ventral (nucleus accumbens) striatal activation: the first, seems to be more functionally connected to the anticipation of reward, and the latter more to actual emotional responses. It might be, that the dopaminergic neuromodulatory system could be intensively involved in evaluation processes, throughout the whole aesthetic experience, even relevant in a pre-classification stage, before the actual experience (Pedroni, Eisenegger, Hartmann, Fischbacher, & Knoch, 2014; Sáez, Zhu, Set, Kayser, & Hsu, 2015).

To summarize, evidence from neuroaesthetics indicates, that experimental methods should focus on a system-oriented approach and evaluating, how a neuromodulatory system can be influenced, by non-invasive as well as invasive methods. By pushing the function of the aesthetic perception into a hypothesized predetermined direction, the modified evaluation and affective response of the experience and the involved affective and cognitive systems, can be examined with methods, which can probably modulate the state of the recipient. Neuropharmacological methods have already shown to stimulate or reduce processes and shifting perceptual outcomes, measured on several levels of observation (Crockett & Fehr, 2014; Stahl, 2008). We therefore want to discuss two mechanisms (chapters: Social status and social reputation as a variable of environmental context and Liking and wanting in art and aesthetics), where neuropharmacological effects are likely to make contact with the model of aesthetic appreciation and judgement (Leder et al., 2004).

empirical aesthetics and neuropharmacology in collaboration.

The bridge between empirical aesthetics to neuropharmacological methods, as a novel interdisciplinary approach, substantiates the supposed assumption from the theoretical and methodological review:

(1) Neuropharmacological research examines systems rather than brain regions; researchers from several disciplines (philosophy, empirical aesthetics, sociology, art history) agree, that an aesthetic experience is an expand activity of the mind, influencing diverse networks in the brain. (Benjamin, 1996; Cattaneo et al., 2014a, b; Chatterjee & Vartanian, 2014; Chatterjee & Vartanian, 2016; Eco, 2016; Leder et al., 2015; Liessmann, 2010)

(2) On a neurological level, neuromodulators are messengers between neurons and cell-bodies, and those chemical reactions reflect the contact with the outside world (Stahl, 2008).

Therefore, neuromodulators could be also seen as the neurobiological representatives/messengers from contextual influences; they translate extrinsic influences into neurochemical reactions, enabling humans to interact properly with their environment.

(3) Empirical neuropharmacological studies often use well-established paradigms from other fields, such as social, economic and psychological science. Hence, neuropharmacology, as a method and as a research field, delivers additional information and a new perspective to existing research in empirical aesthetics.

However, for developing study designs that are using neuropharmacological approaches in empirical aesthetics, we require to further narrow the research interest. On this account, the following section (Social reputation as a state influencing criteria in aesthetic appreciation) concentrates on a specific context variable, namely *social reputation*. Based on this variable, research in empirical aesthetics and neuropharmacology is discussed.

Social reputation as a state influencing criteria in aesthetic appreciation

Researchers studying hierarchy and structures in social societies, do not agree on a unified definition of the term ‘social status’. However, most consent exists with the definition, that social status is described by the respect, esteem and prestige, that an entity (a person or a target) has in the eyes of others (Blader & Chen, 2014). Social reputation could therefore be seen, as a manner to express social status. Furthermore, both variables must be differentiated from related constructs, such as hierarchy, power, socioeconomic status, dominance, prestige, or leadership (Blader & Chen, 2014). In the following, we therefore focus on specific features, describing social status and social reputation: On the one hand social status, as well as social reputation, is not existing without a social contact of some kind. Therefore, a part of the status is defined by the outcome of the observers’ evaluation process. On the other hand, status does not rely completely on the observers’ evaluation, but also differs extensively between context and individuals. That means, that social status and social reputation can be nourished by demographic characteristics, such as race, age or gender, but also by group affiliation, social competition, pro-social behavior, empathy or other forms of social behavior (Barclay, 2010; Berger et al., 1972). Whatever the nurture of the social status or social reputation might be, status is the evaluation of the social position of an entity, i.e. a person or a target. The micro-politics theory of status by Anderson and Kennedy (2012) notes, that an individual status has both components, the group’s judgements of which the person deserve higher/lower status, and the individual’s motivation and ability to maintain and seek higher status. This theory implies, that status as well as reputation has intrinsi-

cally a social and group-oriented character, however, it is also a creation of the person's mind. Furthermore, the person individual traits and states determine, if the person even seeks social status to achieve a certain reputation. Therefore, the person will first evaluate, whether the interacting group—which is probably able to evaluate him— has a sufficient and interesting social reputation, respectively status. Affirming this, a motivation is built, leading to adaptive behavior for the sake of the person's own status and reputation. For additional individual traits see the review of Anderson and Cowan (2014).

The hormonal basis and empirical evidence for social status will be discussed in the neuropharmacological part of the next chapter (social status and social reputation in empirical aesthetics and neuropharmacology). However, Knight and Mehta (2014) quote several hormones connected to social status: (a) One of the leading hormones is testosterone, a steroid hormone derived from cholesterol. Secretion of testosterone results in a chain of reactions, starting at the hypothalamic-pituitary-gonadal (HPA) axis. Like other hormones, testosterone has the ability and purpose to keep, respectively put, a person in a specific state to reach a specific goal (Roney, 2016). On a neurobiological level, hormones like testosterone have a vigorous coordinating function, by influencing several neurotransmitters, such as dopamine or gamma-aminobutyric acid (GABA), but also communicate with other hormones, like cortisol. On the behavioral level, testosterone levels are highly correlated with motivational behavior in status seeking and maintaining in social groups (Eisenegger et al., 2011). At last, testosterone is one of the messengers translating contextual information from extrinsic stimuli to coordinate reaction intrinsically.

(b) Cortisol is a steroid hormone of the glucocorticoid family and is also released into the HPA-axis. Cortisol is connected to physical and psychological stress stimulants, leading to stress responses in the body (via the corticotropin-releasing hormone stimulating the adrenocorticotrophic hormone, which finally stimulates cortisol) (Stahl, 2008). The female pendant to testosterone, concerning sexual characteristics in women, is (c) estradiol. As testosterone is a precursor for estradiol, also biosynthesized from cholesterol, both hormones are present in females and males, leading to an intertwined coordinating function during action behavior in social status issues. Further involved hormones are (c) oxytocin, a neuropeptide hormone, which has been connected to social behavior and social cognition, and (d) vasopressin. The latter is likewise a neuropeptide and has been connected to status behavior. Although research of the hormone vasopressin concerning social status is still an uncharted field in neuropharmacology, the interest of this thesis lies mainly in the hormone testosterone, and the testosterone-cortisol interaction mechanisms. The dual-hormone hypothesis by Mehta and Josephs (2011) claims, that testosterone is only related to status seeking, when cortisol levels are low. However, testosterone in interaction with high cortisol levels blocks status-seeking behaviors. Therefore, in experimental

set-ups, which intend to create acute changes in testosterone levels in the participants, it might be necessary to control for stress hormones (such as cortisol and/or alpha amylase).

Social status and social reputation as a variable of environmental context

In this thesis, we use social reputation as an environmental context variable for aesthetic experiences. Our argumentations, that this variable can be used for contextual influences is in line with our previous theoretical discussion and with the adapted model by Leder et al. (2004), illustrated in Figure 4: In sociology, art and aesthetic appreciation has been introduced as an interactive experience in a certain context (Bourdieu, 1985). Within this context, art gains a social value (Eco, 2016). From a psychological perspective, Silvia (2005a, b) claims a work of art to be an economic and cultural good keeping some value. Locher et al. (2010) describes the environmental context by including social-cultural and socio-economic factors. Leder and Nadal (2014) illustrate in their model, that social influences and social discourse affect directly aesthetic judgement. Even interpersonal social influences have been examined by Pelowski et al. (2014). This implies, that an art object has a *social component*, and gains *through the evaluation of people its reputable position*. We already introduced those features in the definition of social status. Furthermore, the perceiver determines during his personal evaluation, if the art object is a reputable target. During his evaluation process, the perceiver takes all contextual influences into consideration—also the opinion of a group of others judging the artwork.

This means, that the environmental context is partly created with social reputation factors. Thereby, the artwork represents a perfect medium as a reputation target. A medium for a group, which evaluates the artwork and give the same artwork a certain status. The perceiver evaluates on a personal level the reputation potential. Under these assumptions, social reputation seems to be a suitable candidate for a variable of environmental context, able to create, maintain and renegotiate the aesthetic judgement of the recipient.

In this thesis, social reputation is claimed to be an environmental context variable, although social reputation could also suit for a personal or an artistic context variable. Social reputation in the personal context, is represented by the attitude of the person against social status, determined by traits and state of the person. The artwork in its context itself could be a reputable object. However, above all, social reputation exists through social life and social discourse. As social reputation seems to include all kinds of context (artistic, personal, environmental) but is not limited to only one form, we anticipate, that social status will influence the whole information processing during an aesthetic experience.

social status and social reputation in empirical aesthetics and neuropharmacology.¹

So far, in empirical aesthetics, studies of the influence of social status on the aesthetic experience do not exist. The closest approaches in empirical aesthetic research examine variations of pre-classification and context (Leder, 2013). E.g., Brieber et al. (2015) and Eidelman, Patterson, and Crandall (2010) studied the authenticity of an artwork; Kirk et al. (2009) examined the change in evaluation, if an artwork was either described as being created by a computer or a person². Furthermore, Belke et al. (2010), Gerger and Leder (2015) and Huang et al., (2011) changed the context by manipulating the artworks' title and the artists' names³. These are some examples of empirical studies, where the manipulation of the context, whether semantic, with regard to the content⁴ (Lacey et al., 2011) or socially by changing the creator or the discourse of the surrounding⁵ (Silveira, Fehse, Vedder, Elvers, & Hennig-Fast, 2015), enable an *aesthetic status* as a predictor for higher appreciation and valuation. This empirical evidence found, that such context manipulation lead to a top-down classification mechanism in the perceiver and influence the cognitive and the affective evaluation of the aesthetic experience.

In neuropharmacological studies, research regarding social status is more prevalent, especially, in connection with the steroid hormone testosterone: Eisenegger et al. (2011) accentuated in their neuropharmacological study the role of the steroid testosterone as an important contributor in achieving and maintaining social status. Beside the involvement of testosterone in sexual stimuli (Miller & Maner, 2010), several further studies showed rising testosterone levels in anticipation of a competitive situation (Salvador, 2005; Newman et al., 2005; Wu, Eisenegger, Zilioli, Watson & Clark, 2016). Testosterone seems to be a rudimentary influencing component behind the motives of *status gathering* and *keeping*, leading to cooperative, fair and reputable-seeking behav-

¹ From now on, brain regional involvement in quoted studies, focusing on social status/reputation or similar variables, will be listed in the footnotes. Regional involvement is not the mayor interest of this thesis, however, contrasting areal involvement of studies in empirical aesthetics and neuropharmacology can be compared.

² Preference was accompanied with greater neural activity in medial OFC, ventromedial prefrontal cortex (VMPFC); when image was thought to be from a museum, higher activity in entorhinal cortex and temporal pole (memory involvement) (Kirk et al., 2009).

³ Rembrandt authenticity condition led to greater OFC vs. fakes to frontopolar cortex and right precuneus activity (Huang et al., 2011).

⁴ Ease to identify work as art evoked ventral Str, hypothalamus and OFC (Lacey et al., 2011).

⁵ Painting was either from the Museum of Modern Art or from an education center: first condition led to higher precuneus, inferior parietal cortex as well as bilateral ACC and temporoparietal junction activation. (Silveira et al., 2015).

ior (Eisenegger et al., 2010; van Honk, Montoya, Bos, van Vugt, & Terburg, 2012; van Honk, Will, Terburg, Raub, Eisenegger, Buskens, 2016).

However, effects on the behavioral level (Bos, Panksepp, Bluthé & van Honk, 2011) as well as activations in specific brain areas⁶, are not alone due to testosterone, as the steroid is highly intertwined with its metabolite estradiol leading to activation in the amygdala (Eisenegger, von Eckardstein, Fehr, & von Eckardstein, 2013). Further anxiolytic effects arise from reactions with GABA-A (Fernandez-Guasti & Martinez-Mota, 2005), and cortisol mediates stress responses (Metha, Mor, Yap, & Prasad, 2015). Concerning reward issues, the dopaminergic system, with activation in striatal areas, seems to be important for anticipation of reward and learning mechanisms (Eisenegger et al., 2011; Hermans, Bos, Ossewaarde, Ramsey, Fernandez, & van Honk, 2010). These findings support the assumption of a broad coordinative function of testosterone (likewise other hormones) of external as well as internal stimuli, either preparing or holding a person in a necessary state leading to various behavioral responses (Roney, 2016).

Figure 6 shows assumed influences of testosterone and of stress hormones on the information process, based on the model of aesthetic experience (Leder et al., 2004). The red arrows point to contextual factors (such as context, social discourse, pre-classification), to the emotional and the affective state of the person and to social status representatives, like domain specific expertise, interest, and knowledge among others. We assume, that the changed information processing, evoked by social reputation manipulation, will influence the continuous evaluation process of the experience. As we suppose, that this process is a decision-making process, the decision is defined by the valuation of the aesthetic object. Hence, changes should be measurable on the behavioral level, described by an aesthetic judgement and an aesthetic emotion.

On a neurobiological level, the contextual influences will be translated from hormonal messenger (like testosterone). Therefore, testosterone levels should anticipate behavioral reactions. It should be noted, that we expect stress hormones to moderate the responses of the participants.

⁶ Further involved brain areas associated with testosterone: OFC and Am activation when seeing facial expressions (Hermans, Ramsey, & van Honk, 2008); parahippocampal gyrus and Am regions are related to endogenous and exogenous testosterone (Heany, S.J., van Honk, J., Stein, D.J. & Brooks, S.J., 2016); DLPFC, insula during Ultimatumgame, in female participants greater activity in Str, cingulate and right OFC (unfair offers), positive correlation testosterone levels and caudate activation (Kopsida et al., 2016); see further: van Wingen, G., Mattern, C., Verkes, R.J., Bruitelaar, J. and Fernández, G. (2010); Volman, Toni, Verhagen, and Roelofs (2011); Stanton, Wirth, Waugh, and Schultheiss (2009).

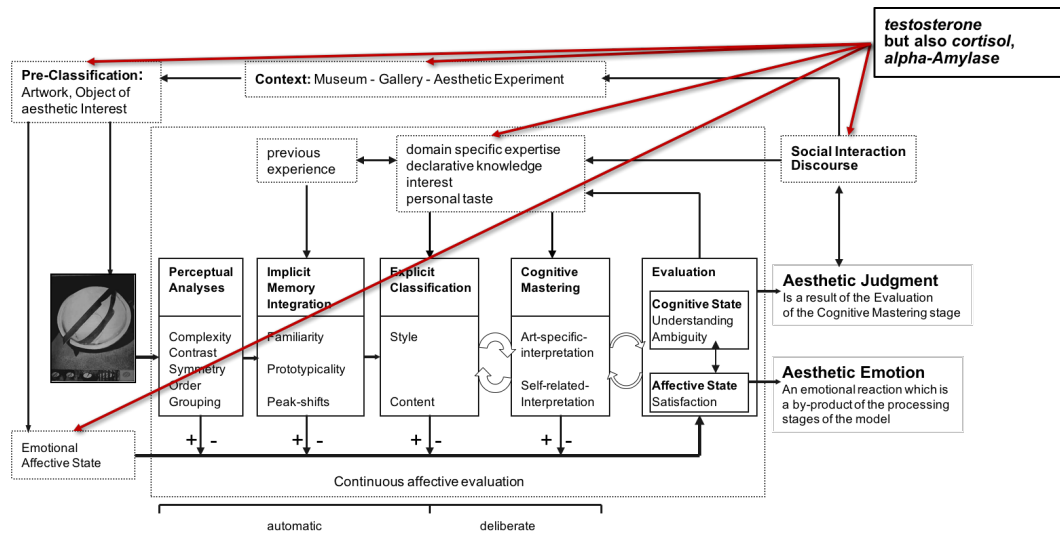


Figure 6. Assumed main influence of testosterone and stress hormones on processing stages based on Leder's et al., (2004) model

Liking and wanting in art and aesthetics

Art appreciation has been discussed as a perception with no active goal but high in pleasure (Chatterjee & Vartanian, 2004; Pearce et al., 2016). In other words, the perception of an artwork produces liking, without necessarily an actual wanting component. Wanting seems to exist as a motive before the actual appreciating moment, i.e. the anticipation of reward, and depends on an incentive motivation to actively approach to a supposed reward (Berridge et al., 2009). It seems likely, that wanting requires cognitive evaluation as well as memory involvement, followed by associative learning mechanisms; someone needs to know, if he wants something before he puts definitive efforts in his approach to achieve consumption (Berridge & Robinson, 1998). This dissociation is discussed as *liking versus wanting* and could be explained by distinct neuromodulator circuits (Berridge, Robinson, & Aldridge, 2009).

A hedonic value considering pleasure during aesthetic appreciation, has been discussed as a consequence of an opioidergic and a cannabinoid neuromodulatory system activation (Biederman & Vessel, 2006; Chatterjee, 2014; Pearce et al., 2016). This pleasure is also defined as liking. The neurochemical involvement of opioidergic, cannabinoid but also GABAergic modulation has found some interest in neuroaesthetic studies (Berridge et al., 2009; Katzung, 2004; Skov, 2010; Stahl, 2008).

Whereas, wanting has been linked to a dopaminergic involvement, being an important neurotransmitter for reward anticipation and experience (Eisenegger et al., 2011; Pedroni et al., 2014; Vessel et al., 2012). Furthermore, dopamine is cooperating with testosterone responses, during social status issues. Interestingly, the dopaminergic involvement and hormonal influences are hardly discussed in neuroaesthetic research.

The reason for the underrepresented studies focusing on hormonal influences as well as dopaminergic involvement could be originated in a widely-held view in empirical aesthetics, that art appreciation is a liking experience, without a wanting component. This means, that under the assumption that wanting is not a relevant contributor in aesthetic appreciation, the manipulation of dopamine would have *no significant influence* on the aesthetic experience. However, is there actual no wanting in aesthetic appreciation?

The anticipation of an aesthetic experience could be a salient incentive for aesthetic appreciation. The anticipation is built on context, in which the aesthetic experience takes place. This could reflect a wanting component in aesthetic appreciation. Additionally, the wanting could also be triggered of the artwork's content; outgoing from a functional perspective of aesthetic appreciation, visual artworks, for instance, can stimulate the need of the recipient to get new information out of his perception process (Biederman & Vessel, 2006; Bourdieu, 1985; Eco, 1977), in other words, an individual, adequate surplus of informational value. The wanting could therefore lie in the motivation to seek new information (Berlyne, 1974). Under this perspective, the dopaminergic involvement could have an overall relevance during the aesthetic experiences. This notion was also mentioned by Vessel et al. (2012), who mentioned the dopamine involvement in dorsal striatal areas also *during* the aesthetic experience.

Therefore, we propose that art objects could be a suitable stimulus to disentangle liking from wanting. To examine this approach, we want to support this explorative examination with research knowledge in empirical aesthetics and neuropharmacology. We intend to raise direct behavioral measures, but also implicit measures, and investigate, through the cooperation of both disciplines, contextual influences on aesthetic appreciation.

Proposals for study designs focusing on social reputation

Based on the theoretical and empirical evidence, we exemplify two study designs with a focus on social reputation as a context variable. Both studies are built on existing knowledge in both disciplines, empirical aesthetics and neuropharmacology. However, as this is a new interdisciplinary approach, the study set-ups have been thought alongside the variable of interest. As already mentioned, for these two study examples, evaluation is defined as the information process (a decision-making process) leading to a form of valuation (a judgement). In the first study, valuation will be measured with several ratings scales based on Leder et al. (2012). This study design will examine the motivational components of gaining social reputation. We therefore examine the effort taken to reach a social status within the experiment, and will suggest a paradigm, where the seeking for social reputation is stimulated. The second study attends to investigate the

already discussed probable components of wanting (respectively willingness) and liking during aesthetic appreciation. Here, in this study design, valuation is measured via choice, based on the work of Reber et al. (2004).

Especially the second study takes also the economic perspective of an aesthetic good into account, by including social affiliation to a certain group (economic or artistic in value). This economic account is also grounded on research paradigms in neuropharmacology, where often, game theoretic approaches are used to examine social status and hormonal reactions during social interaction. In the chapter ‘social status and social reputation in empirical aesthetics and neuropharmacology’ it was mentioned that testosterone also coordinates striatal activity; hence, dopaminergic modulation could be involved in both, anticipation of reward as well as within the appreciating moment (see therefore also Chatterjee, 2014; Pedroni et al., 2014; Vessel et al., 2012). Although, in this study designs the dopaminergic involvement will not be directly evaluated, we want to investigate wanting, or more specifically willingness to pay, on a behavioral level through choice. This as a first step, to investigate this field, with the supposed new interdisciplinary research possibilities. However, in both studies, we recommend controlling for levels of testosterone and stress hormones, namely cortisol and alpha-amylase.

In the following, we will present the general hypothesis formulated for both studies. Furthermore, the overall method including a pre-requisite, suggested target group, experimental manipulation, instruments and general statistical analysis are discussed. Afterwards, each proposed study set-up is explained including procedure, stimuli and assumed statistical analysis. Both study examples will hypothesize relationships within each experiment, and the expected effects of the experiment manipulation will be anticipated. Both experiments do not state to explain a general model, but take the position of an exploratory examination, to head for a new interdisciplinary collaboration in empirical aesthetics and neuropharmacology.

General hypotheses for both studies

Under the assumption that motives of status, especially social reputation as kind of a manner of social status, contribute during the information-process of art and aesthetic appreciation, we hypothesize:

- a. *If social status is a significant variable in an aesthetic experience, then the manipulation of social reputation should influence aesthetic evaluation processes under status-sensitive contexts and lead to a change in the valuation of the aesthetic experience.*

Regarding hormone levels, we further hypothesize that:

- b. *the baseline levels of testosterone and the testosterone-cortisol ratio are positively correlated with status seeking.*

Methods

Both proposed experiments are laboratory studies. Pre-questionnaires will be provided online with an individual login to ensure the person's privacy and data security. Analysis of the collected data will be: (1) analysis of behavioral data, (2) analysis of eye-tracking measures, (3) analysis of saliva samples (4) analysis of self-rating collected by the questionnaires.

participants.

The participants will be contacted by private contacts, where their participation is on a voluntary base or students can conduct at this study to earn credits for their seminars, about 70 persons per experiment, all male. We decide to focus primarily on male persons for the time being, as on the one hand male persons are more susceptible for status sensitive contexts, considering the chosen manipulation (Eisenegger et al., 2010). On the other hand, further investigations, with possible testosterone administration methods, will be based on the pharmacokinetic study of testosterone gel as in Eisenegger et al. (2013), where, for the time being, only male persons have been examined. All persons will be informed about the procedure and the expenditure of time. However, information about the purpose of the study will not be given beforehand. The participants will be adults from about 18 to 30 years old. In the studies, as hand-orientation is considered unimportant, right- as well as left-handed persons are included; they can have normal to corrected vision and the dominant eye will be determined before the procedure. This is necessary, as we intend to measure eye-movements with an eyetracking-device. Participants will be informed through a study information paper about the technical involvement during the procedure and the saliva samples taken during the experiment beforehand. Furthermore, the participants will have to give their written informed consent. All subjects will attend a single testing session, with a pre-online survey and they will provide several saliva samples—pre-, peri- and post the experimental procedure. The studies will be conducted in accordance with the standards of ethical principles regarding human experimentation, with approval by the ethical commission of the University of Vienna.

instruments.

The stimuli for the experiments will be presented on an LCD monitor Samsung SyncMaster 2443BW, with a resolution of 2,400, 1,920, 1,200 pixels and a screen refresh rate of 60 Hz. All participants will sit inside a dimly lit room (background luminance about 500 lux) about 60-70 cm away from the monitor, with their heads rested in a chin rest. During the experiment the experimenter will assure a low noise-rate. The eye movements from the dominant eye will be calibrated before the experiment started. The eye-movement of the dominant eye will be monitored during

the entire experiment to ensure the recording of the eye-movements during all trials (Eyelink 1000; SR Research Ltd.; desktop mount). The experiment will be controlled by Experiment Builder Software Version 1.10.165 on a PC running the system software Windows.

For both experiments the response times and responses will be measured with clicks on a keyboard. Saliva samples will be collected before, for one study during the experiment, and again for both experiments about twenty minutes after test phase with SaliCaps. Salivary testosterone and cortisol levels as well as alpha-amylase will be measured using a mass spectrometry. In total participants will have to give three saliva samples for the first study and five saliva samples for the second study.

pre-requisite for both studies.

All participants will conduct a pre-online survey about one week before the experiment answering the following questionnaires: (a) behavioral inhibition system/behavioral activation system (BIS/BAS) questionnaires (Carver & White, 1994), (b) Single Item Narcissism Scale (Konrath, Meier, & Bushman, 2014; Ames, Rose, & Anderson, 2006; Konrath, Meier, & Bushman, 2014) and (c) social anxiety scale (Rytwinski et al., 2009) and (d) general questions about art knowledge and art interest. Furthermore (d) standard demographic data will be asked, such as sex, age etc. The participants will have to provide a code, in order to link the data of the questionnaires to the data gathered during the studies. The codes will only be known by one experimenter.

public and private condition as a manipulator.

The effect of the social reputation will be tested by two different methods, which will be discussed in detail in the study set-ups of the experiments. However, both studies will use a public versus private condition paradigm. In the first study, participants are told, that their performance will be either public, valued from psychological experts and pursued. This information will be given through a written note on the computer screen. In the private condition the attending participants are guaranteed, that their performance is anonym and their decisions and effort will be for their own.

In the second experiment the manipulation of the social reputation by means of a public/private paradigm will be similar to an ingroup versus outgroup scenario. However, although similar, we will not apply a kind of ingroup/outgroup paradigm, where it is clear from the beginning, if the person feels like a member of the group or not. The two value-groups, used in study 2, are in line with persons, who stand for either economic or artistic values. If the participants will feel like a member as one of the groups he is assigned to, and if the group is therefore

high in reputation for the participant, can probably be answered through artistic expertise measures. However, those results would just be speculative and are not directly measured. The study focus lies not in group membership or group affiliation, but if potential representatives of certain reputable groups can influence the evaluation process and therefore the choice of the participant. The procedure in detail will be outlined in the respective subchapters.

general statistical analysis for both studies.

For all mentioned probable confounding variables (see questionnaires in pre-requisite), which should be controlled through randomization, statistical analysis will be applied to ensure non-significant influence in both experiments. For the general hypothesis for the pre- and post-saliva samples, *t*-tests (Bonferroni corrected) will be applied with baseline hormone levels as co-variates. Furthermore, correlations between the rating scales of the BIS/BAS questionnaire, the social anxiety questionnaire and the Single Item Narcissism Scale will be estimated. Art expertise and art knowledge will act as interesting modulating variables, especially in the second study, where economic and artistic values are part of the experimental set-up. We will discuss this issue in detail in the chapter ‘study 2: sub-hypotheses and expected results’.

Study 1: cubistic artworks

experimental set-up.

The experimental set-up is based on the study of Kuchinke, Trapp, Jaccobs, and Leder (2009), with a second part extending the research data already gathered. The first task is quite similar to Kuchinke’s et al., (2009) study, in which the participants have to recognize cubistic artworks, varying in their accessibility (see Figure 7. Stimulus examples of study 1). The study of Kuchinke et al. (2009) examined the moment of recognition, i.e. the explicit classification and the comprehension of an artwork based on the hedonic fluency model (Reber, Schwartz, & Winkielman, 2004). Their theoretical background was based on the model of aesthetic appreciation and judgement, in which aesthetic emotions evolve during the processing stages and influence the stages explicit classification and cognitive mastering (Leder, et al., 2004; Leder & Nadal, 2014). The moment of recognition was operationalized by a click of the participant, when he thought he has recognized the content of the picture; those click-moments were correlated with the pupil dilatation. Kuchinke et al., (2009) found that, the highest pupil dilatations were found for high fluency stimuli and the lowest pupil dilatation with low fluency stimuli. Furthermore, a post hoc analysis showed, that the pupil dilatation, following the subject’s behavioral response, was positively correlated with individual preference ratings of the paintings. The ratings were taken paper-pencil after the task.

In the upcoming study, we intend to combine Kuchinke et al. (2009) study with a social environment manipulation; i.e., we want to investigate, if artworks can stimulate status relevant criteria in people. Here, we want to examine, if a no threat conditions (*private condition*) will lead to more evaluated decisions, with higher liking ratings on recognized artworks and with a positive correlation to baseline testosterone levels (and low levels of cortisol) (Wibral, Dohmen, Klingmüller, Weber, & Falk, 2012). Whereas a *public condition* should evoke the need for the participant to seek for a social reputable status (Eisenegger et al., 2011; Terburg & vanHonk, 2013), leading to longer response latencies—exact procedure will be explained in short. The differences in response latencies in the first task ‘recognition’ represent the effort taken by the participant, when either be observed or unobserved. Therefore, we will have two groups in a between subject design. The participants will be randomly assigned, either to the private or the public group. In this experiment, no further control group is planned, as we already state, that the private group is the non-manipulated group and represent the control group.

As an extension of Kuchinke’s et al. (2009) work, we evaluate further aesthetic emotions. In the past study, variables of abstractness, familiarity, complexity and preference were evaluated on a 5-point Likert scale. In the upcoming study, further emotion variables are included with the scales arousal, valence and clearness on a 7-point Likert scale (based on Leder, et al., 2012).

In our study 1, we focus on several variables, which are the *moment of recognition* (explicit classification) and the *comprehension of an artwork* (Kuchinke et al., 2009; Leder, et al., 2004; Leder & Nadal, 2014), represented by an understanding of what the participants are seeing. We further concentrate on *aesthetic emotions* evolved during the processing stages and influencing the whole aesthetic information process, towards the pivot point evaluation. We therefore collect ratings of several aesthetic emotions through self-report in the second block and intend to correlate the data raised with the effort taken by the participants. We further examine the *influence of social reputation* through the public group compared to the private group. In *public condition* participants are told, that their performance will be listed in a rank list of all participants and discussed in the next research seminar; whereas, their performance is *private* in the control condition. At last, we explore the *need to create a social reputable position* on the behavioral level and on a neurochemical level, by controlling levels of testosterone and cortisol.

stimuli.

The stimuli will be the taken from the set of Kuchinke et al., (2009). Of the 39 cubistic artworks, 30 artworks (15 with faces, 15 landscape) are used for the experimental procedure for the upcoming study. The other nine artworks are used for the test rounds (randomly assigned to participant), to give the participant an idea about the task. All those cubistic artworks have al-

ready undergone a pre-rating from a larger sample of cubistic paintings, rated on levels of complexity, abstractness and familiarity on a 5-point scale. The artworks will differ in their accessibility, where high accessible paintings are easy to recognize and low accessible artworks will need a more intense and longer viewing. In total, there will be three levels of accessibility leading to ten paintings per level. In Figure 7 one example for each stimulus-group of accessibilities are shown, where the left painting is high in accessibility and the right painting is more difficult to solve and therefore low in accessibility. The cubistic paintings will be shown one at a time, in a randomized order. The stimuli will subtend at maximum a vertical visual angle of 17.19° and a horizontal visual angle of 15.28° (based on the study design in Kuchinke et al., 2009).

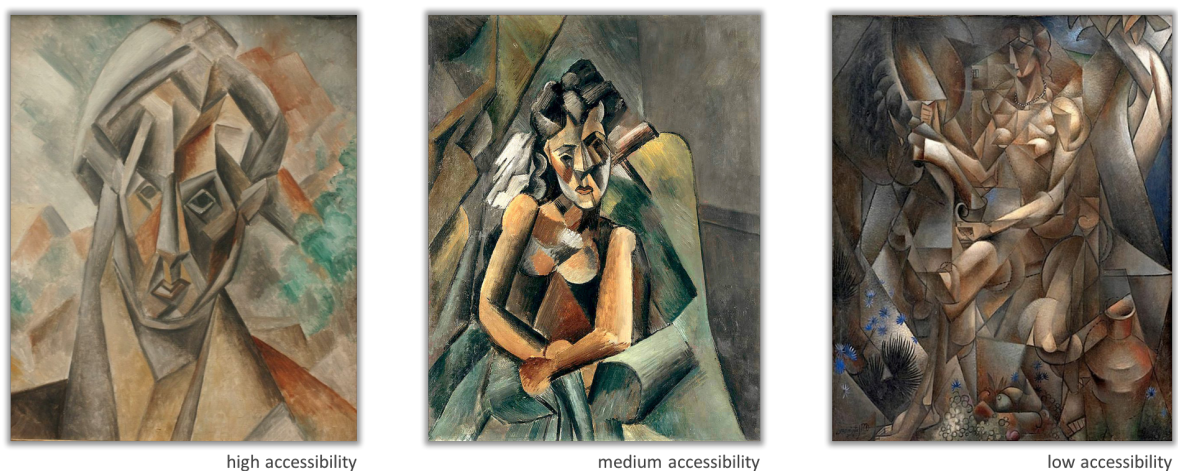


Figure 7. Stimulus examples of study 1

procedure: behavioral measures and physiological measures.

The experiment is divided into two blocks. In block one the main task for the participants is to recognize a face. Whereby, 15 artworks have a face and 15 artworks are landscapes (see Figure 8 for landscapes examples). The participants will be instructed to press a button (key press) as soon as they depict a face (or no face) in the cubistic painting. They should try to answer as quickly as they can, but only if they think, they have recognized the face, otherwise they should press the no-key. The participants could answer through the button press on the keyboard, with possible answers 'yes' and 'no' (key on the keyboards change between participants, to exclude confounding of possible side preferences). If the participant does not press a key, (so he is either too slow or has not decided in time) the timeout after stimulus presentation ends the cycle of the present stimulus. Additionally, the test-subjects are instructed to blink as less as possible during stimulus (painting) presentation. Instructions will be given written beforehand on the computer screen. Here, the participant will also be divided into the public and private group. In the private condition the note on the computer screen inform the participants that their performance and the data collection is private and anonym. Therefore, no social interesting information is given to

the participant. In the public condition, we induce a social reputation manipulation by a notification on the computer screen, that their performance will be listed in a rank-list and the results will be discussed in the next research seminar for further evaluation processes.

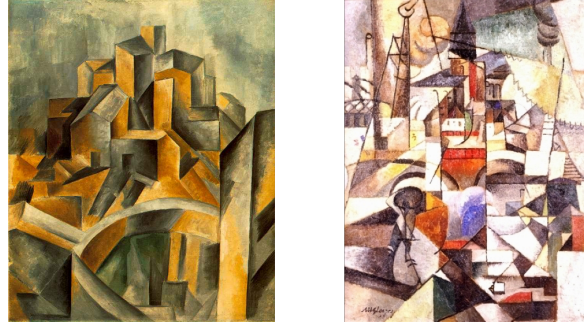


Figure 8. Study 1, examples of landscapes

The same artworks are shown, like flashes of pictures, 10 times in a row, with a presentation time of 10x50 ms and between same stimulus presentation a pause of 1,000 ms blank screen (see Figure 9). Therefore, the timeout is determined after the 10 times of presentation, respectively after 10,500 ms. Whereby, the last screen is blank to guarantee a continuous eye and pupil recording around the time of the response. The last 1,000 ms should limit pupil dilatation reaction due to spontaneous changes in the screen luminance. After each trial, a time period of 3,000 ms is given in which he is allowed to blink. Based on the study of Kuchinke et al. (2009) we expect working time of circa 15 minutes for block one.



Figure 9. Study 1 stimulus presentation. Each artwork is shown 10 times in a row. The grey slides in between represent the blank pages between stimulus presentation.

Beside the eye-tracking and pupillometric indices, the response times of the participants will be recorded. Therefore, the variables measured in block one are: response key (yes, no, timeout), response time, and area of interest: faces in artworks with faces. In block two, the main

task is to look at the artworks and afterwards give a set of ratings. The stimulus (artwork) is presented for 9,000 ms (based on the study of Kuchinke et al., 2009). After the experimental phase, the participants will be asked to give their ratings with scales on arousal, clearness, complexity, feeling of comprehension, liking and emotional valence on a 7-point Likert scale, ranging from 1 (not at all or negative) to 7 (very much or very positive). Clearness represents an additional question, measuring how easy a face can be detected in the artwork. The exact questions and descriptions in German are listed in the Appendix. The variables taken in block two are pupillary reactions, eye movements (fixations on faces) and the ratings.

saliva samples during the experiment.

In study 1, saliva samples are taken 20 minutes before the experiment starts and 20 minutes after the experiment. During the waiting phases, participants are instructed to do nothing special but sit around. Electronic devices are forbidden during waiting phases, but participants can read some unexciting newspapers. Saliva samples are taken for analysis of testosterone and cortisol.

statistical analysis.

For the comparison of the ratings and the accessibility of the artworks we will apply Bonferroni corrected *t*-tests. Analysis of correlation will be used to measure relationships between baseline testosterone, response latencies and liking ratings. As our major focus will lie on the manipulation of the social status and reputational motives, we will investigate differences between the groups public/private condition. Here we apply a 2x2 repeated measure ANOVA for the two groups private/public with the variables response latencies and baseline testosterone. We further will look at the variables response latencies, eye-tracking measures, ratings, accessibility and baseline testosterone as predictors for the two groups private/public and will look at variance inflation factors (multivariate analysis).

study 1: sub-hypotheses and expected results.

In *Table 1* the anticipated results are listed alongside all variables, that we intend to measure during the experiment. In detail, we expect the following results for the variable *moment of recognition*: (a) believed recognized artworks with faces will be more liked in private condition (fluency) (Forster, Gerger, & Leder, 2015). A further correlate for this relation will be the scale clearness, which we expect higher for low response latencies and vice versa. (b) In the private condition, results of accessibility will show similar results like Kuchinke et al. (2009) found. Therefore, high accessible artworks will be more liked and low accessible artworks will be less liked. (c)

Whereas, artworks low in accessibility ('difficult to solve') will be more liked in public condition, based on the theory of a deeper understanding of the artworks (Muth & Carbon, 2013). Furthermore, the seeking of social status could also trigger the intellectual abilities, presented by the participant and lead to a possible positive correlation of complexity, liking and arousal.

The variable social reputation is manipulated through the public/private conditions. Here, we expect that male with high baseline testosterone levels as well as scales of the pre-requisite showing persons, who are high in status seeking, will show *shorter response latencies in the private*, but *higher response latencies in the public condition*. Here the presumption is stated, that status seeking persons want to be sure, they give correct and honest answers (Eisenegger, et al., 2010, vanHonk et al., 2016).

Based on the study of Kuchinke et al. (2009), we expect *pupil dilatation* during the moment of recognition. Therefore, we intend to compare the measures taken of the eye-recording in block one and block two. However, we are aware, that the form of picture presentation (flashes) could disturb the pupil dilatation measures. Nevertheless, if pupil dilatation was found in the first block, recognition of the artwork has already been occurred. Therefore, we do not expect intense pupillary reactions in the second block. If the artwork has not been recognized in block one, then we expect the pupil dilatation in the second block; further indices for a no-recognition is the failure in given a button press response.

If those assumptions are incorrect, and the pupil dilatation are unrelated to a believed recognition, we assume that pupil dilatation is a more suitable correlate for emotional reactions during the viewing of artworks. Therefore, we will correlate the emotional ratings (liking, arousal, emotional valence etc.) to examine those relationships.

Table 1.
Expected results of study 1.

	private	public
pre-testosterone level (= Baseline)	less competitive behavior, less effort in a good performance: more faults (see face, where is non), less no-presses compared to public and...	fitting with honest, but competitive response, more effort in a good performance: less faults, more no-button presses and...
response latencies	...due to less competitive situation: in total longer response latencies (r.l.)	...shorter r.l. in high accessibility artworks; lower r.l. in low accessibility artworks (want to be sure)
post testosterone level	non-significant	higher in high status-seeking persons compared to less status-seeking persons
cortisol level	non-significant	higher
pupillometric control	pupil dilatation short after button press (replication of Kuchinke's et al., 2009 study)	no correlation with button press; more pupillometric reaction in low accessibility artworks (more difficult to solve)
liking ratings	higher in high accessibility artworks (like in Kuchinke et al., 2009)	higher in low accessibility artworks

The overall sub-hypotheses for study 1 are stated as follows:

- 1.a. *The status-sensitive context in the public condition will influence the information process of the aesthetic experience and change behavioral responses in the direction of a believed better performance.*
- 1.b. *The status-sensitive context in the public condition will influence the information process of the aesthetic experience and change valuation judgements with higher emotional reactions in solved artworks.*
- 1.c. *Status seeking persons (high baseline testosterone and high status seeking scales) will show shorter response latencies in the private condition and longer response latencies in the public condition.*

Study 2: abstract artworks

experimental set-up.

The proposal of study 2 is based on the theoretical background and empirical evidence of the study by Luring et al. (2016). In their experimental set-up, social as well as monetary context was changed to induce priming effects. The effects of contextual information, by the means of social and monetary primes, were measured with liking ratings of the participants on a 7-point Likert scale. The social prime was based on the assumption, that art taste is driven by socio-cultural contexts. The social influence was also remarked as an overall influencing factor during an aesthetic experience by Locher's et al. (2010) work as illustrated in Figure 4 of the present thesis. The monetary prime in Luring's et al (2016) study has also been assumed to be a factor of social distinction, varying through value or rarity of artworks. Social distinction through the social primes should give the participants a kind of orientation to judge the artworks, presented during the experiment. Results showed, that both priming types, social as well as monetary primes, influenced the liking ratings in direction of a believed higher value. For the proposal of study 2, we take the results from the study by Luring et al. (2016) and propose a decision-making problem, where we take social as well as monetary values into account.

We therefore propose for study 2 an ambivalent decision making problem stated at status relevant criteria. Here, we mainly look, if the influence of social context is able to dissociate liking ratings from the selection of an artwork—willingness to pay/wanting. Although we do not claim to measure directly *wanting* as an operationalized variable in the study-design, we are interested in, what context dependent variables are relevant, for dissociating liking from a personal selection of an artwork and of the willingness to pay. The decision-making problem is based on two value-characteristics—an *artistic value* and a *monetary value*—which are determined to have effects in opposite directions. In Figure 10 an example of a stimulus set is presented, where from left to right the artwork's artistic value rise, whereas from right to left the monetary value increases. The artistic and the monetary values are shown through pictograms, which are explained through a note on the computer screen beforehand. Those pictograms should help the participants to memories

sides (artistic and monetary) and height of value of the artworks easily. We hope, that the pictograms give a quick orientation and reduce the need to check value side. If the participants learn sides and values within a short learning period, we expect less downward eye-movements to the pictograms during the relevant test phases. Both, side of the brush and the coin, and side of the high artistic value versus high monetary values are randomized between subjects to exclude confounding of side effects. The experimental set-up will include the two groups of values, with a between subject design; here, the artistic group is represented by the ‘Akademie der Künste’ and a monetary group, represented by the ‘Auktionshaus Wittelsburg’. Latter is a fake name and does not exist for real. The whole experimental set-up is based on a cover-story (complete cover-story in German can be found in the Appendix).

Additionally, to control pushes into the directions of a believed reputable group, we integrated the public/private condition with a within-subject design. The public/private condition is constructed through two blocks, where the participants have to make the same task. In the public block the participants are informed beforehand, that they are monitored through a recording of a video camera. The recordings will be evaluated by either the artistic or the monetary representatives (value group, see above are randomized between subjects). In the private block, the participants are informed, that the data collected is anonym. The order of public/private, respectively private/public, is counterbalanced between participants. In the chapter ‘procedure: behavioral measures and physiological measures’ we will run through the experiment in detail.

In study 2, we are interested in the induced change ($\Rightarrow$ push) of a valuation judgement, when participants are set in a status-sensitive context. The valuation is measured by preference (Reber et al., 2004). In *Table 2* we explain the assumed relational consequences of our manipulation. If the participant is assigned to the artistic value group (upper table), then we expect liking and willingness to pay to be similar in the private block. In the public block the choose of the artworks are shifted to the more artistic valuable artworks, marked by the big brush—higher artistic value artworks are the preferred choice. Willingness to pay in the group ‘Akademie der Künste’ represents the control condition: As no valuable information regarding monetary values is given, judgements in willingness to pay should not change between the two blocks private/public.

If the participants are assigned to the monetary value group (bottom table) then, we, respectively, expect no significant difference in judgements of liking and willingness to pay in the private group, but now for willingness to pay. Here, the shift in judgement is expected to occur on the variable willingness to pay, as monetary context information is given. In this group, liking satisfies the functions of a control group, as we do not expect any changes of choice concerning liking here.

Table 2.

Relations of reputation group examined (between subject) shown in public/private group (within subject) of study 2

Audience: experts of 'Akademie der Künste' 

WITHIN (counterbalanced)	private	public
Liking	L/W similar	more artistic value artworks chosen
Willingness to pay	like control condition, should not change between pr/pu	

Audience: experts of the 'Auktionshaus Wittelsburg' 

WITHIN (counterbalanced)	private	public
Liking	like control condition, should not change between pr/pu	
Willingness to pay	L/W similar	more monetary value artworks chosen

BETWEEN

Although the experimental set-up seems to be quite complicated, the relations of the variables are logically connected. There are two variables, liking and willingness to pay. Each variable gets an informational representative, characterized by the two groups, the artistic and the monetary. Dependent on the contextual information for either one of the constructs and given by the representatives, we intend to change the informational process in favor of either liking or willingness to pay.

If the anticipated causal relationships of our assumptions can be accepted, then we further assume, that there is a dissociation between liking and wanting. We are aware that this study has a highly explorative character, where not only a dissociation of variables is examined, but also if the paradigm works. Further research on a theoretical, methodological and empirical level is necessary to prove the reliability and the validity of our proposed experimental set-up.

stimuli.

The paintings will be 48 abstract paintings and contemporary art since 1960. We choose abstract art because on the one hand confounding of the content of the painting is reduced in abstract paintings. Further the argumentation that artistic and monetary value can drift apart in abstract paintings and contemporary art is more plausible than in old famous artworks, where monetary and artistic value are expected to be positively correlated. There will be always three pictures shown at once. Here, all three pictures will have the same style, for example Expressionism, Cubistic, Futuristic, Informel, Surrealism, Tachism, Pop Art etc. The whole stimuli set will be listed in the Appendix.

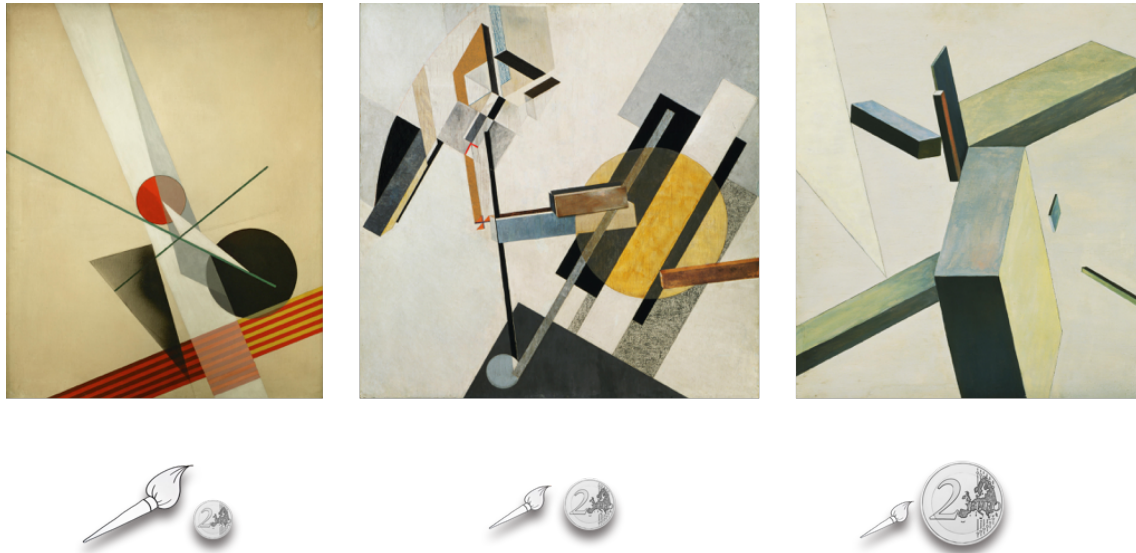


Figure 10. Stimulus set example of study 2

The sets of the artworks are not only similar in style, but also almost all from the same artist, have similar content and are similar in appearance concerning color, lines among other. The similarity of the artworks within a set, have been pre-rated by ten persons of different age, sex, and knowledge in art expertise. The order within the set is completely randomized between participants to exclude effects of picture arrangement. As all paintings are seen twice per participants, mere exposure will influence all paintings equally and should therefore not have any relevance for this study.

procedure: behavioral measures and physiological measures.

The experiment starts with the cover-story, in which the participants get to know the value groups involved, the creation of the stimulus sets and for what value they stand for. The explanations are given in written form, through notes on the computer screen and by pictorial examples. However, the participants do not only have to understand the whole set-up, but also learn the task and the directions of the two values. Latter is important to reduce eye-movement to the pictograms. Therefore, before starting the experimental trials, the participants will complete several test-runs.

The main task is to answer two questions, after a 20 second presentation time of a stimulus set, in which the participant has to do nothing but just free viewing. One of the questions examines liking, where the participants have to choose the artwork, which he likes most (in German: *‘Welches Kunstwerk gefällt Ihnen am Besten?’*). The other question concerns willingness to pay, and the participant should choose the artwork he would buy during an auction, if he has enough money the purchase the artwork (in German: *‘Wenn Sie ausreichend Geld zur Verfügung hätten, welches der Kunstwerke würden Sie in einer Auktion kaufen?’*). The order of the two questions changes with

each stimulus-set. We wanted to make sure, that the participant has to read the question thoroughly. Therefore, the participant has no time-limit to answer those two questions.

Each participant runs through the whole block twice. The difference in the blocks is the contextual influence given by the public/private condition. In one of the blocks, the participants will be informed, that his behavior is recorded with a camera behind him and the data will be evaluated by either the representatives of the Akademie der Künste or persons from the Auktionshaus Wittelsburg. Therefore, the experimenter arranges a camera behind him, which is connected to a laptop. In the private condition, the camera will be removed. If the private condition is in the first block, then the camera is not yet installed and will be arranged by the experimenter. The two condition within subject are counterbalanced between participants. Furthermore, all information is given by written notes on the computer screen. Therefore, the experimenter will not get in verbal contact with the participants, however, the participant can watch the experimenter install and de-install the camera. It should be noted, that there is no actual recording happening, and the participants will be informed after the experiment, that the recording is fake.

Beside the choices given by the participants, eye-movement are taken during the trials. Therefore, the measured variables during the experiment are: choice and eye-movement recordings. Latter is interesting has we expect a shift to the most liked artwork reaching the end of the presentation time. The fixation times will be interesting to correlate them with the preference in liking and willingness to pay. Furthermore, we expect fixations to change, when context is manipulated in the public group.

saliva samples during the experiment.

In study 2, saliva samples are taken 20 minutes before the experiment start, after the first block and 20 minutes after the experiment. During the waiting phases (for pre- and post-sample), participants are instructed to do nothing special but sit around. Electronic devices are forbidden during waiting phases, but participants can read some unexciting newspapers. In total five saliva samples are taken: for analysis of testosterone and cortisol pre- and post-experiment; samples for alpha-amylase are taken pre, peri (after block one) and post experiment. The post-experiment sample will be taken directly after block two, as alpha-amylase reactions can be measured after five minutes of stress trigger in saliva.

statistical analysis.

For the comparison of the ratings and the accessibility of the artworks we will apply Bonferroni corrected *t*-tests. Analysis of correlation will be used to measure relationships between baseline testosterone, fixation times and liking ratings as well as the willingness scale. For the

analysis, if more liking is associated with the choose of the artworks, we apply a *t*-test for two groups, the chosen artworks and the non-chosen artworks and look at the average liking ratings. The same will be applied for the willingness to pay scale. Further a correlation between the two scales liking and willingness will be examined. The influence of the manipulation of the social status and reputational motives will be investigated by differences between the groups public/private condition. The included variables will depend on the before mentioned statistical outcomes. Relevant criteria will be fixation times, ratings, and baseline testosterone.

study 2: sub-hypotheses and expected results.

In *Table 3* the anticipated results are listed alongside all variables, that we intend to measure during the experiment. The major focus in study 2 is the influence of the contextual information given through the representatives of a certain group. In the experimental set-up, we already explained the assumed relationships and expected changes to occur due to the experimental manipulation, summarized in *Table 2*. Further interesting possible modulators could be art expertise and art knowledge of the participant. If a participant has for example an expertise in arts, it could be that this person has a group affiliation to the artistic representatives. Therefore, such existing knowledge of the person could confound the experiment manipulation.

Table 3.
Expected results of study 2

	private	public
pre-testosterone level	in general, persons choose more monetary value artworks; however, if high testosterone person thinks he has a certain artistic knowledge, he will choose more artistic artworks	persons high in testosterone choose more in the direction fitting the suggested reputation group (higher dopamine level, more interest in full aesthetic experience & social reputable artworks)
post-testosterone level	non-significant	rise in testosterone, but is not expected to reach significance
stress response: alpha-amylase, cortisol level	non-significant after private block	stress response measurable after public block, positive correlation with hormonal stress levels and status maintaining behaviour (affiliation to reputation group)
liking & willingness to pay choices	control condition, when value and context information are different in kind (i.e. variable liking in Auktionshaus Wittelsburg group & willingness to pay in Akademie der Künste group)	participants change their choice of the artwork due to context information
pupillometric control	more saccades to more liked artworks; fixation will anticipate choice	more saccades in general; fixation will not anticipate choice—no correlations

The overall sub-hypotheses for study 2 are stated as follows:

- 2.a. *In a context high in artistic values, social reputable artistic information will influence the evaluation of the aesthetic experience, leading to a change in judgement in favor of artistic values (liking).*
- 2.b. *In a context high in monetary values, social reputable monetary information will influence the evaluation of the aesthetic experience, leading to a change in judgement in favor of monetary values (willingness to pay).*
- 2.c. *If context and informational value are different in kind (either artistic or monetary), judgements are not influenced over time.*
- 2.d. *Status seeking persons (high baseline testosterone and high status seeking scales) will be more sensitive to social reputation information, compared to less status seeking persons.*

Discussion and implications

An initial objective of this thesis was, to identify and discuss the variable evaluation in the research field empirical aesthetics and to find its position during the information process of an aesthetic experience. Therefore, one of the first steps of this work sought to determine the art object appreciated, and its specific nature, triggering the human mind to an evaluation process and initiating a broad network of cortical and sub-cortical areas (Brown et al., 2011; Chatterjee, 2011, Pearce et al., 2016; Pelowski et al., 2017 in press). Herein, we question, if a focus on the function of art could define art as an object initiating and catalyzing the transition of a person from a neutral state into an aesthetic state, leading to an evaluation process. In reviewing theoretical and empirical literature, the evaluation stage was discussed alongside several processing models, dimensions and frameworks (Chatterjee & Vartanian, 2014; Jacobson, 2006; Pelowski et al., 2016): Here we introduced the model of aesthetic appreciation of Leder and Nadal (2014, first published from Leder et al., 2004), where evaluation is a stage before an aesthetic judgement. Pearce et al. (2016) keeps a more broad and general perspective, in describing some dimensions of an aesthetic experience—the semantic, the affective and the evaluative dimension. Whereas, in Locher's et al. (2010) model, evaluation is more a continuous happening placed in certain contexts—the personal, the artifacts and the environmental context.

The main aim of this thesis was to develop an understanding of aesthetic appreciation from a functional perspective, by focusing on the evaluation process of the information given in a certain context. Here, the evaluation stage was described as a pivot point, gathering all information emerging from the aesthetic experience; this, in turn, enables the perceiver to come to a valuation of his aesthetic experience, meaning an aesthetic judgement and an aesthetic emotion (see chapter: Aesthetic experience: evaluation as a pivot point in processing aesthetic information). Most of the theoretical models highlighted the continuous influence of cognitive and affective qualities and their effects on an aesthetic judgement. However, this thesis claims, that context is one of the most important influencing variables during the information process of an aesthetic object, even possible to change the whole functional relationships between the processing stages of this appreciated moment. The cognitive and affective dimensions are included in one of the influencing contexts, namely the personal context. Nevertheless, the artistic and environmental context, based on Locher et al., (2010) model and illustrated in Figure 4, are believed to strongly contribute to the aesthetic appreciation. Therefore, an aesthetic experience is discussed as a functional fulfillment of a satisfying mind activity (evaluation) for the perceiver within all contexts. The interference of context on the evaluation can lead to a valuation of this experience. Here, the height of the informational value and the depth of the affective value de-

scribe the spectrum of the aesthetic appreciation, leading to myriad possibilities and combinations of aesthetic judgements and emotions.

Interestingly, it seems that context is an inherent variable in art and aesthetic experiences. If we take a look at empirical attitudes in empirical aesthetics, it appears that the variability explained by context, keeps empirical aesthetic researchers in a steady state of uncertainty regarding methodological customs. The relationship between experimental approaches establishing causality and the to examine cause is difficult to catch, when the research object lead to such an ambiguous perception. Hence, paradigms can be innovative and astonishing but lack to grasp the relationships of the variables influencing the aesthetic perception. This can be especially seen in neuroscience, where neuroscientific methods are frequently used in the field of neuroaesthetics, but lapsing to deliver causal relationships.

Furthermore, before going into any experimental set-up, the following question should be raised: ‘what is the nature of the focus point or of the variable examined?’ (Morton & Williams, 2010). Does the investigation look at the *causes of effects*: then the question is addressed to what are the reasons, the causes for an outcome, respectively the measurable effects? If the *effects of causes* are examined, a hypothesis about what are the results, the effects of an outcome, is developed and do they change when manipulated. These are two kinds of investigations and viewpoints looking at a causal relationship. Heckmann (2005) remarks, that with good established theoretical models, causality is a by-product and not a main goal in scientific research. And the consistence of models in empirical aesthetics support his statement (Pelowski et al., 2016). In the last two decades, a lot of research in the field of empirical aesthetics has been made and the concentration on the effects of the causes in experimental designs, did not blend the dissociation between those two directions of interpretation and their definitions, meaning the nature of the examined variable. However, with the upcoming of neuroscientific technology—a heritage from other, mainly medical, research areas—the use of those methods loosened the bound to theoretical models in empirical aesthetics, producing lots of research results unconnected to theoretical models; models which can formulate and logically connect causal relationships of variables and their effects. By dissociating causes from effects, and furthermore understand the kind and intent of variables manipulated in experimental designs, the examined variables must be defined and operationalized; just as well as it limits the possibilities in methods applicable. In consequence of current research custom, many hypotheses have been built on empirical results, not on theories of the phenomena. Even the examined phenomena are not well articulated, leading to problems of weak operationalization of the research object and validity (Davis-Strober & Dana, 2014; Simmons, Nelson, & Simonsohn, 2011).

To formalize evaluation and its position as a variable in an experimental set-up, we specifically looked at the variable from a methodological perspective. Based on the literature review of empirical aesthetics, evaluation, as a prerequisite of an aesthetic judgement, was questioned concerning its attitude—being a cause or an effect of aesthetic appreciation. Although, this question cannot be answered to an entire satisfaction, we tried to highlight the methodological consequences and dissociated evaluation from valuation. We furthermore defined evaluation as a prerequisite for valuation. To further examine causal relationships, a theoretical implication is to establish a full formulized theory model of causal relations during an aesthetic experience; such a model could serve as an interesting methodological tool for future empirical research in neuroaesthetics.

In our review of current neuroaesthetics research, we stated our concerns about the investigations of brain areal involvement. In chapter ‘Neuroaesthetics and its boundaries in capturing aesthetic’, we named some of the empirical research in neuroaesthetics and questioned the methodological approaches and the results gained from those studies. The conclusion of this review was, that methods with a functional, process- and system-oriented approach fit more the nature of the research area—the phenomenon of an aesthetic experience and the perceptive ambiguity, created by aesthetic objects. In consideration of the altering information-value of context sensitive stimuli (Benjamin, 1963/1996; Eco, 1977), like aesthetic objects in visual art, the perceptual outcome is determined by the interactive play of the recipient’s and the artwork’s potential to influence the affective and cognitive systems of the perceiver. A manipulation of these neurobiological affective and/or cognitive system, should therefore lead to an altered perceptive outcome. If a composition of stimuli, given by the aesthetic object, can actual provoke the full range of probable perceptual outcomes, the neuropharmacological approach provide the necessary pushing mechanisms to manipulate those networks of art and aesthetic perception. As we state, that this perceptive result is determined by its function for the perceiver, the shift should be noticeable on different dimension of the aesthetic experience (Pearce et al., 2016). Those could be measured based on the model of aesthetic appreciation and judgment (Leder et al., 2012), respectively by choice (Reber et al., 2004).

This theoretical derivation lead us to the empirical propositions in this thesis: the introduction of a new interdisciplinary research cooperation of empirical aesthetic and neuropharmacology, and a new approach in neuroaesthetics. The main variables of interest, were based on the analysis presented in first part of this thesis, the evaluation of an aesthetic object embedded in contexts (personal, artifact/artistic, environmental). Here, we focused on the variable social reputation, respectively social status. Alongside this variable, we reviewed neuropharmacological results and research in empirical aesthetics and discussed the connection of those two research

fields. Considering our variable social reputation, the manipulation of contextual influences out of a social and environmental perspective, appears to be a promising candidate for a manipulator in an experimental set-up. Furthermore, the system-oriented approach was found in both disciplines: On the hand, the functional interaction of perception, memory integration, explicit classification, cognitive mastering and evaluation, within a certain context and social discourse field, in empirical aesthetics research. On the other hand, the main interest in neuropharmacology is the study of neuromodulatory systems. Important neuromodulators for social reputation are the steroid hormone testosterone as well as stress hormones. Their involvement was correlated with social status seeking and maintaining behavior and, among other social status influences, honest behavior (Eisenegger et al., 2004; Eisenegger et al., 2010, vanHonk et al., 2016).

As another important contributor in aesthetic appreciation, the dopaminergic involvement was emphasized for a promising future research prospect. The neuromodulator dopamine was also discussed in various neuroaesthetics studies, where dorsal respectively ventral striatal activity was found (Vessel et al., 2012; Pearce et al., 2016). Therefore, it seems, that dopamine is not only involved during the anticipation of reward, but also during an aesthetic experience, until a form of epiphany leads to the involvement of the DMN. Herein lies a future empirical prospect in interesting interdisciplinary research possibilities; however, a further theoretical discussion, about what an experience is, a form of evaluation process or the valuation of an aesthetic appreciated moment, would be necessary to tighten the strings for empirical study designs. The objective with the introduction of dopamine was not only to give a prospect for future research. Testosterone and dopamine are highly intertwined neuromodulators during reward; that means, dopamine (among other neuromodulators) must be considered as a relevant contributor, maintaining in the process. Therefore, the interconnectivity of neuromodulatory systems must always be kept in mind in neuropharmacological studies, creating uncertainty in causal relations, but also opening new questions worthwhile studying.

In the last section, we proposed two study examples: The first study focuses on social reputation and its motivational effects on taking an effort in a good, honest performance. The second study attempts to find a probably dissociation of liking and a kind of wanting, willingness to pay, in aesthetics. It is still an open question, if those two possible motivators—liking versus wanting—for aesthetic appreciation even exist in a dissociated form or whether there is no difference. It could also be the case, that a kind of meta-factor makes it look like, that there is some form of dissociation. This means, that both valuation criteria, liking or wanting, could be nurtured from yet unknown third variables: a probably notion could be, that liking is nourished from affect and emotions, whereas wanting is more affected by cognitive processes.

However, as we and other researchers already stated, affective and cognitive dimensions of an experience cannot be separated, but are intertwined mechanisms during a mental process, explained by the continuous informational interchange of affective and semantic dimensions. An inspiration here, is actual art itself, which shows with a very sensitive and elegant style, that there are different doorways to understand complexity, causality or dissociations; behind each door lies an answer for one viewpoint, but it is unlikely, that the whole ambiguity, or ways of seeing, can be grasp at once.

However, what we can examine, if there are different mechanisms, by lying out our hypothesized assumptions. To prove that, we proposed for both experiments a manipulation with a public and a private group, to create social disturbances within the participants. In the first study, the public condition is created by informing the participants, that their performance will be made public and valuated by experts. In the second study, the participants are made believed, that they are being watched by one out of two reputable groups. In both studies, we expect that persons high in status seeking are valuing artworks in the direction of reputation. On the one hand in study 1, by being more precise and correct in doing a performance and on the other hand in study 2, by approving more the proposed reputation group. An interesting notion is expected in the second study, where the control condition switches between participants, depending on the group assignment. With an artistic sample (Akademie der Künste), we expect the operationalized monetary value (willingness to pay) to become the control condition within participants; whereas, with a monetary audience (Auktionshaus Wittelsburg), liking—the supposed more artistic value—is expected to show no significant differences within participants—that means between the blocks public/private—and stand therefore for the control condition (see *Table 2*). The suggested experimental set-up could probably show the ambiguity in aesthetic experiences, and deliver new content for the interpretation of the open questions: How much does context create ambiguity, respectively is ambiguity intrinsically a context factor? Does context create, maintain and renegotiate aesthetic judgements?

The interaction between an aesthetic object and its recipient is probably implicit, suggestive and affective (Leder & Nadal, 2014). The outcome of the information-process of an aesthetic experience allows a variety of meanings and emotional experiences for the recipient (Eco, 1977; Pelowski et al., 2011). An experience full of ambiguity, where neurobiological systems rather than specific brain-areal involvement, enable the evoked individual impressions of a specific sense and perception (Chatterjee & Vartanian, 2016; Liessmann, 2009; Pearce et al., 2016). A perception of an informational value, that could be handled as a method, as an object of observation or just as a hedonic experience.

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List of abbreviations

aMPFC	anterior medial prefrontal cortex
ACC	anterior cingulate cortex
AI	anterior insula
Am	amygdala
CN	caudate nucleus
DLPFC	dorso-lateral prefrontal cortex
DMN	Default Mode Network
GABA	gamma-aminobutyric acid
HPA-axis	hypothalamic-pituitary-gonadal axis
Str	striatum
OFC	orbitofrontal cortex
PHG	parahippocampal gyrus
PPC	posterior parietal cortex
VMPFC	ventromedial prefrontal cortex

Appendix

Abstract

This thesis critically discusses, on a theoretical and methodological level, the research of aesthetic experiences in empirical aesthetics and neuroaesthetics. To focus this review, aesthetic appreciation is placed into the context of a decision-making process, in which aesthetic judgements are created, maintained and renegotiated to tie to an aesthetic experience. By taking the perspective of a decision-making problem, the *evaluation of an aesthetic object* is dissociated from its probable outcome—the *valuation of an aesthetic object*. This clear separation enables to take the functional relationship between a perceiver and an art object into account. Herein, context as an independent variable is considered as one of the main drivers in aesthetic judgements, by influencing the evaluation process of an art object. Both approaches, function and context, are taken up to exemplify two study designs. Both study proposals will focus on *social reputation* as a context variable. The evidence of social status manipulations is based on research in neuropharmacology. Study 1 intends to examine social reputation and its motivational effects on taking an effort in a good, honest performance. Study 2 attempts to find a probable dissociation of liking and wanting, operationalized as willingness to pay, in aesthetics. For both studies, we suggest a public versus private group paradigm, to prove our assumptions regarding contextual effects. This thesis intends to serve as a basis for a new interdisciplinary approach in empirical aesthetics and neuropharmacology. Furthermore, with the two study proposals, we hope to deliver a new system-oriented approach into the field of neuroaesthetics.

Keywords

Empirical aesthetics, neuroaesthetics, neuropharmacology, evaluation process, aesthetic judgement, aesthetic emotion, social reputation, social status.

Zusammenfassung

Die vorliegende Masterarbeit diskutiert aktuelle Forschungsmethoden zur Untersuchung von ästhetischen Erfahrungen und wirft einen kritischen Blick, theoretisch als auch methodologisch, auf vorhandene Forschungsergebnisse in der empirischen Ästhetik und Neuroästhetik. Um die Diskussion zu fokussieren, wird eine ästhetische Wertschätzung in den Kontext eines Entscheidungsprozesses gelegt. In diesem können ästhetische Urteile geschaffen, beibehalten und geändert werden, mit dem Ziel eine ästhetische Erfahrung aufrecht zu erhalten. Hierbei wird in dieser Arbeit der funktionale Charakter einer solchen Erfahrung in den Vordergrund gestellt und diskursiv die *Evaluation ästhetischer Erfahrungen* von einer *ästhetischen Beurteilung* getrennt. Ergebnis der theoretischen und methodischen Herleitung ist, dass einerseits ein interdisziplinärer Ansatz von system-orientierte Methoden im Bereich der Neuropharmakologie und empirischer Ästhe-

tik/Neuroästhetik angestrebt wird. Andererseits wird Kontext als Haupteinflussfaktor in Evaluationsprozessen und für die ästhetische Beurteilung angenommen. Diese Ergebnisse werden für eine mögliche empirische Anwendung herangezogen und in Folge zwei Studiendesigns beschrieben. Für beide Studien wird *soziale Reputation* als Kontextvariable operationalisiert. Weiters wird ein öffentliches versus privates Gruppenparadigma vorgeschlagen, um die Annahmen über kontextuelle Effekte zu prüfen. Studie 1 untersucht soziale Reputation und die Motivation für eine gute und ehrliche Leistung. Studie 2 prüft eine vermutete Dissoziation von Mögen ('Liking') und Wollen ('Wanting') – genauer die Bereitschaft zu zahlen – in Ästhetik. Diese Masterarbeit soll als Grundlage für einen neuen interdisziplinären Ansatz in der empirischen Ästhetik und Neuropharmakologie dienen. Darüber hinaus, hoffen wir mit den beiden Studienvorschlägen, einen neuen systemorientierten Ansatz im Bereich der Neuroästhetik zu liefern.

Stichwörter

Empirische Ästhetik, Neuroästhetik, Neuropharmakologie, Evaluationsprozesse, ästhetisches Urteil, ästhetische Emotion, soziale Reputation, sozialer Status.

Study 1: rating descriptions and scales

Zu jedem Bild werden folgende Fragen gestellt:

- *Wie intensiv empfinden Sie dieses Kunstwerk? Hiermit ist vor allem die Intensität Ihrer Empfindungen gemeint. Darunter kann einerseits die körperliche, innere Aktivierung (wie z.B. Puls, Blutdruck, Körpertemperatur) als auch die subjektive Stärke der empfundenen Stimmung verstanden werden. Je intensiver Ihre Empfindung, umso höher der Wert den Sie eingeben.*

(7-Punkt Likert Skala von: sehr entspannend bis sehr erregend)

- *Welche Stimmung löst dieses Kunstwerk in Ihnen aus? Hierbei geht es nicht um den emotionalen Inhalt des Kunstwerks, sondern ausschließlich um Ihr subjektives Empfinden beim Betrachten des Kunstwerks. Die Stimmung, die Sie dabei empfinden, kann dabei zwischen sehr negativ und sehr positiv variieren.*

(7-Punkt Likert Skala von: sehr negativ bis sehr positiv)

- *Wie sehr haben Sie den Eindruck, das Kunstwerk zu verstehen? Hierbei geht es darum, ob Sie für sich eine plausible Interpretation gefunden haben und/oder ob Sie womöglich die Intention des Künstlers/der Künstlerin verstanden haben.*

(7-Punkt Likert Skala von: überhaupt nicht verstanden bis sehr verstanden)

- *Wie komplex empfinden Sie das Kunstwerk? Hierbei sollen Sie Ihr subjektives Empfinden angeben, ob Sie das Kunstwerk als einfach wahrnehmen oder vielschichtig, nicht eindeutig, nicht einfach. Hierbei kann sowohl das Bild inhaltlich, als auch der Stil als komplex oder einfach wahrgenommen werden.*

(7-Punkt Likert Skala von: einfach bis sehr komplex)

- *Wie klar erkennen Sie das Gesicht in dem Kunstwerk? Umso eindeutiger und klarer Sie ein vorhandenes Gesicht erkennen, umso höher sollte hier der Wert sein. Ein Gesicht kann von überhaupt nicht klar bis zu sehr klar erkennbar sein.*

(7-Punkt Likert Skala von: überhaupt nicht klar bis sehr klar)

- *Wie gefällt Ihnen dieses Kunstwerk? Hierbei sollen Sie angeben, wie gut Ihnen persönlich das Kunstwerk gefällt. Ihnen kann daher ein Kunstwerk überhaupt nicht bis zu sehr gut gefallen.*

(7-Punkt Likert Skala von: gefällt mir überhaupt nicht bis gefällt mir sehr gut)

Study 2: cover story

„Die folgende Studie wurde in Kooperation mit dem bekannten österreichischen Auktionshaus Wittelsburg und der Akademie der Künste Wien entwickelt. Die Forschungspartner wollen, dass wir erforschen, welche visuellen Elemente in den Kunstwerken, auf das Gefallen, das Bietverhalten und die Kaufentscheidung Einfluss nehmen können. (weiter mit Leertaste)

Für dieses Experiment haben wir in enger Zusammenarbeit mit beiden Kooperationspartnern ein außergewöhnliches Set von Kunstwerken derselben Künstler zusammenstellen können, die sich systematisch hinsichtlich des künstlerischen Werts, im Sinne kunstwissenschaftlicher Analysen, und ihrem monetären Wert, den sie bei Auktionen erzielt haben, unterscheiden. Sie werden entsprechend dieser Zusammenstellung immer drei Kunstwerke nebeneinander sehen. Sie haben jeweils 20 Sekunden Zeit die Kunstwerke zu betrachten. Währenddessen brauchen Sie nichts tun, es geht dann automatisch weiter. Bitte versuchen Sie sich die Bilder gut einzuprägen. (weiter mit Leertaste)

Durch die Kooperation mit dem Auktionshaus Wittelsburg und mit der Akademie der Künste, war es möglich Kunstwerke zu finden, die sich in ihrem künstlerischen Wert und in ihrem monetären Wert unterscheiden bzw. ähnlich sind. Künstlerischer Wert bedeutet, dass dieses Kunstwerk unter Experten einen besonderen ästhetischen, historischen, wissenschaftlichen oder gesellschaftlichen Wert für vergangene, gegenwärtige und zukünftige Generationen hat. Monetärer Wert ist der Preis, den das Kunstwerk bei der aktuell letzten Auktion erzielt hat. (weiter mit Leertaste)

Für die gemeinsame Studie wurden speziell Kunstwerke ausgewählt, die sich genau hinsichtlich ihres künstlerischen und monetären Wert unterscheiden oder eben ähneln. Sie werden daher 3er Sets von visuell sehr ähnlichen Kunstwerken sehen (gleicher Stil, gleicher Künstler), die entweder einen: hohen künstlerischen Wert, jedoch niedrigen monetären Wert; niedrigen künstlerischen Wert, jedoch hohen monetären Wert; ähnlich hohen künstlerischen und monetären Wert haben. Sie erkennen an der Beschriftung unterhalb der Kunstwerke, wie die Wert-Verhältnisse zueinanderstehen.“

Study 2: separation in between and within participants

„Um das Verhalten und ihre Bewertungen genau untersuchen zu können, wurden wir von den Fachleuten des Auktionshauses Wittelsburg/Fachleuten der Akademie der Künste gebeten,

einen der beiden Blöcke per Kamera aufzunehmen, um diese dann genauer auswerten zu können. Sie werden darüber informiert, welcher der beiden Blöcke mitgefilmt wird.

Der andere Block dient der Universität Wien zur Datenauswertung und unterliegt den strengen Anonymitätskriterien der Universität Wien. Unser Interesse besteht insbesondere darin, Zusammenhängen von physiologischen Maßen (u.a. Hormonlevels), visuelle Kunstwahrnehmung und Evaluation zu untersuchen. Wir bitten Sie in beiden Blöcken möglichst spontane Entscheidungen abzugeben.“

study 2: used artworks

Table 4. Study 2: list of artworks and sets (styles are expressed in German.)

Set	Artist	Style
Set 1	<i>Macke, August</i>	Expressionismus
	<i>Morgner, Wilhelm</i>	Expressionismus
	<i>Kandinsky, Wassily</i>	Expressionismus
Set 2	<i>Blanchard, María</i>	Kubismus
	<i>Valmier, Georges</i>	Kubismus
	<i>Gleizes, Albert</i>	Kubismus
Set 3	<i>Picabia, Francis</i>	Kubismus
	<i>Picabia, Francis</i>	Kubismus
	<i>Picabia, Francis</i>	Kubismus
Set 4	<i>Delaunay, Robert</i>	Orphischer Kubismus, Synchronismus
	<i>Kupka, František</i>	Orphischer Kubismus, Synchronismus
	<i>Severini, Gino</i>	Orphischer Kubismus, Synchronismus
Set 5	<i>Demuth, Charles</i>	Präzisionismus
	<i>Picabia, Francis</i>	Präzisionismus
	<i>Schamberg, Morton</i>	Präzisionismus
Set 6	<i>O'Keeffe, Georgia</i>	Präzisionismus
	<i>O'Keeffe, Georgia</i>	Präzisionismus
	<i>Sheeler, Charles</i>	Präzisionismus
Set 7	<i>Lewis, Percy Wyndham</i>	Vortizismus
	<i>Saunders, Helen</i>	Vortizismus
	<i>Wadsworth, Edward</i>	Vortizismus
Set 8	<i>Lissitzky, El (Eliezer)</i>	Suprematismus - Konstruktivismus
	<i>Lissitzky, El (Eliezer)</i>	Suprematismus - Konstruktivismus
	<i>Moholy-Nagy, Lazlo</i>	Suprematismus - Konstruktivismus
Set 9	<i>Moholy-Nagy, Lazlo</i>	Suprematismus - Konstruktivismus
	<i>Moholy-Nagy, Lazlo</i>	Suprematismus - Konstruktivismus
	<i>Malewitsch, Kasimir</i>	Suprematismus - Konstruktivismus

Set 10	<i>Mondrian, Piet</i>	De Stijl
	<i>Mondrian, Piet</i>	De Stijl
	<i>Doesburg van, Theo</i>	De Stijl
Set 11	<i>Klee, Paul</i>	Bauhaus
	<i>Klee, Paul</i>	Bauhaus
	<i>Klee, Paul</i>	Bauhaus
Set 12	<i>Kandinsky, Wassily</i>	Bauhaus
	<i>Albers, Josef</i>	Geometrische Abstraktion
	<i>Gallatin, Albert Eugene</i>	Geometrische Abstraktion
Set 13	<i>Kline, Franz</i>	Abstrakter Expressionismus
	<i>Kline, Franz</i>	Abstrakter Expressionismus
	<i>Kooning de, Willem</i>	Abstrakter Expressionismus
Set 14	<i>Debré, Olivier</i>	Tachismus
	<i>Soulages, Pierre</i>	Tachismus
	<i>Soulages, Pierre</i>	Tachismus
Set 15	<i>Johns, Jasper</i>	Neo-Dada, Nouveau Realism
	<i>Johns, Jasper</i>	Neo-Dada, Nouveau Realism
	<i>Rauschenberg, Robert</i>	Neo-Dada, Nouveau Realism
Set 16	<i>Calder, Alexander</i>	Mobile, kinetische Kunst
	<i>Calder, Alexander</i>	Mobile, kinetische Kunst
	<i>Calder, Alexander</i>	Mobile, kinetische Kunst

Authorship

Declaration of Authorship:

I hereby declare that the thesis submitted is my own unaided work. All direct or indirect sources used are acknowledged as references.

Eigenständigkeitserklärung:

Ich erkläre hiermit ehrenwörtlich, dass ich die vorliegende Arbeit selbständig angefertigt habe.

Die aus fremden Quellen direkt und indirekt übernommenen Gedanken sind als solche kenntlich gemacht.

first and last name

city, date, signature