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– Research program –

The Experimental Aesthetics of Style*

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* This research paper contains a research program I developed for a project, which – as it happens – didn't come to pass. It contains a number of ideas on possible directions for Experimental Aesthetics (in section 2), and sketches of a number of experiments (in section 3). Though it is unusual to make such sketches available, in fact everyone profits by doing so. I am currently doing other research and do not have the time to implement these studies. Please feel free to conduct any of the proposed studies (be warned that these are rough sketches, and it will take time and sweat to implement them), to develop others along these lines, or be inspired to do something entirely else!

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Abstract

A thorough analysis of Experimental Aesthetics reveals that some research areas, methods, and types of stimuli have gained much less attention than others (cf. section 2). In this working paper, it is proposed to one the basis of the strengths and weaknesses of previous research in Experimental Aesthetics, with an experimental part based on innovative study designs and methods, developed with the aim of investigating neglected areas.

Specifically, for the area of style, there exists a large gap between various long-standing traditions of thorough research with a mostly theoretical focus, and a small and highly dispersed body of empirical and experimental work, which has been rapidly growing over the last years. Whereas the former research, although theoretically well-founded and with high analytic quality, has paid relatively little attention to empirical verification, the latter research (experimental style research, for example in cognitive psychology, design research, and marketing) is highly diverse and often not sufficiently routed in a stable theoretical basis. With the aim of bridging this gap, together with Emanuele Arielli (IUAV Venice), the author has developed new approaches to the Experimental Aesthetics of style.

This position paper outlines the author's research focus in Experimental Aesthetics. Based on an analysis of unsolved problems in Experimental Aesthetics, it sketches promising areas of future research. It begins with a short historical overview of Experimental Aesthetics (section 1), and a thorough analysis of its current strengths and weaknesses (section 2). On this basis, and with a specific focus on experimental style research, the author has developed plans for two research projects: "Style, personality, and affective state" (section 3.1), and "Style production, variation, and cross-modal influences" (section 3.2). The research proposed here is partly based on the applicant's doctoral research on style (Siefkes 2009; 2011; 2012), and on his collaborative work with Prof. Arielli on style and personality, stylistic multimodality, and designer's styles (Siefkes/Arielli (in preparation [a,b])).

1. Experimental Aesthetics: the first century

Experimental Aesthetics is one of the oldest branches of experimental psychology. The field began with the visionary ideas of Gustav Theodor Fechner, who developed a very thorough conception still inspiring today (Fechner 1876). Currently, Empirical or Experimental Aesthetics – the term "Empirical Aesthetics" implies a somewhat broader methodology, but in practice the terms are often used interchangeably – is becoming a discipline in its own right: It is a field of enquiry which combines a highly developed methodology with an interdisciplinary research perspective and a widely varying disciplinary background of active researchers.

For most of its existence, Experimental Aesthetics was a small research field lodged precariously between psychology, philosophical aesthetics, and art history – disciplines which were otherwise mostly separated and often hostile towards each other. It was advanced mainly by a few pioneering researchers such as Fechner, George Birkhoff (1933), and Hans J. Eysenck (1940; 1957). In the late 1960s, Daniel E. Berlyne revived the field after a phase of obscurity (Berlyne 1971; 1974) and dominated it for two decades. In the 1980s, new methods of computer-based statistical analysis were employed, and Colin Martindale emerged as an important figure (Martindale 1986; 1990).

In the 1990s, the field expanded rapidly and was revolutionized by the introduction of brain imaging techniques. Today, Experimental Aesthetics is a well-established but still rapidly growing discipline with its own journals and institutions, which faces rapid changes, as evinced by the growing role of neuroaesthetics (cf. Chatterjee 2010) and the integration of hypotheses and perspectives of evolutionary aesthetics (cf. Menninghaus 2003; 2011). Recently, psychological models of aesthetic production and perception processes have been proposed that further the development of a solid theoretical basis of Experimental Aesthetics (cf. Leder et al. 2004; Jacobsen 2006).

However, even though rapid advances in research perspectives and methodology have been made, a careful look reveals a number of limitations, some of which are more pronounced than others. This might be partly due to the precarious academic situation of the field, which for most of its existence did not have specialized journals, scientific institutions, study programs, and designated university chairs – a situation which is currently changing. Experimental Aesthetics is leaving a phase of rapid and uncontrolled development, and is about to become an established discipline. This change makes it necessary to reflect on its present strengths and weaknesses, to avert the risk of blind spots becoming embedded in the structures that are established today.

For example, Experimental Aesthetics was dominated by the analysis of static visual stimuli; music has been another recurrent topic of interest. Reception processes of literature and film were comparatively seldom studied, as were cross-modal influences between stimulus types (e.g. between text and pictures in books, or between music, spoken language, and images in film). Another limitation is the focus on artificially created stimuli, and – even more pronounced – the neglect of experimental studies of artistic and creative production processes.

The proposed research project is based on an analysis of these and further limitations, which unduly narrow the range of questions posed and methods adopted in Experimental Aesthetics (cf. section 2). On this basis, two series of studies have been developed: “Style, personality, and affective state” and “Style production, variation, and cross-modal influences” (cf. section 3).

2. Current limitations and future directions of Experimental Aesthetics

At the beginning of Experimental Aesthetics, we find the seminal work of Gustav Theodor Fechner, one of the pioneers of experimental psychology. Fechner's "Principles of aesthetics" (Fechner 1876) were so far-ranging that some aspects and hypotheses following from them have not yet been tested. Whereas, for example, the principle of aesthetic help ("Prinzip der ästhetischen Hilfe") has been studied in different contexts (cf. e.g. Arielli 2012), the principle of association ("Assoziationsprinzip"), which posits the importance of what we would today call semantic factors (content or information), was less thoroughly studied due to methodic difficulties (but see Martindale et al. 1990).

Since Fechner's time, Experimental Aesthetics has not developed evenly. Some areas have been studied very thoroughly, such as judgment of artificially created visual stimuli, preferences for properties such as complexity and symmetry, and color preferences; other relevant areas have been comparatively neglected.

If one compares the theoretical perspectives developed in Experimental Aesthetics with the body of experimental work that has been done, a bias of the latter in regard to research focus becomes obvious:

(1) In the area of visual aesthetics, static stimuli are overrepresented; furthermore these are often printed images. Film has received comparatively little attention in experimental approaches,[1] partly due to the problem of different modalities and codes involved.[2] Interactive media (e.g. video games), three-dimensional stimuli (sculptures, land art) and 'life' performances (theater, opera, happenings, or street art) are rarely investigated in controlled experimental studies.

The experimental studies proposed for the 5-year research period (cf. section 3) use mostly texts (literary and non-literary) or music as stimuli. Visual stimuli are used in comparison with literary or musical stimuli (studies 7 and 12), and in the unusual form of design sketches (study 11).

(2) Artificially constructed stimuli have a significant and legitimate place in Experimental Aesthetics (e.g. Berlyne 1971; Höfel 2008; Sato et al. 2012), and will remain important in the future. However, conclusions drawn on this basis cannot be always generalized to non-artificial stimuli. Thus, research with real artworks (or segments of artworks) should be emphasized, and even possibilities of using 'naturally occurring' contexts for aesthetic perception (such as in museums, theaters, or auditoriums) should be considered.

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[1] In the last decade, film studies has evolved as an academic discipline; however, it mostly uses methodologies based on structuralist, semiotic, hermeneutic, and (recently) corpus-based empirical methods.

[2] The change from static to moving images involves consideration of a number of additional structural features (e.g. montage, camera movement, etc.). The combination of moving images with different information on the auditory channel (speech, music, and background noise), and current technologies such as surround sound and 3-D-images, raise even larger complexity problems.

‘Real-life’ stimuli such as authentic paintings and literary works have long had their place in Experimental Aesthetics, but a closer look reveals that they have mostly been used in connection with some general hypotheses such as the mere-exposure hypothesis (Leder 2002), which explains familiarity effects, or rather imprecisely formulated hypothesis (such as Colin Martindale’s theory of “primordial content”; cf. Martindale 1990) which are therefore flexible in application to diverse stimuli. It is often challenging to use real artworks to test more specific hypotheses, but methodologies can be developed to overcome the problems associated with the inherent diversity and multidimensionality of ‘real-life’ aesthetic stimuli. The next step should be to combine the use of authentic stimuli with more specific hypotheses and non-reductive theories of artistic production and reception.

To achieve this, new study designs have to be developed. For example, the kind of studies preferred by Berlyne’s “New Experimental Aesthetics” (Berlyne 1974) rarely work for non-artificial stimuli, since they are designed to compare specific features which cannot be isolated in such stimuli.

One aspect of this limitation is that authentic films and literary works were comparatively seldom used to test hypotheses in Experimental Aesthetics. In the first series (cf. section 3.1, studies 1 to 6), it is planned to do just that: Real literary works will be employed as stimuli (though not always in their entirety), in order to examine more complex hypotheses which could not be tested with artificially created stimuli. In part of the second series (cf. section 3.2, studies 9 and 10), subjects will themselves write short texts. In no case, researchers will produce artificial texts as stimuli, or manipulate existing texts in order to change specific properties.

At the same time, the role of artificially created, or modified, stimuli will remain significant especially in regard to neuroimaging studies (EEG, fMRI), where it is often important to precisely control all relevant stimulus properties (cf. Jacobsen et al. 2006; Höfel/Jacobsen 2007).

A further limitation of previous research should be considered:

(3) Most studies focused on aesthetic stimuli in a general way, treating aesthetic experience as a ‘holistic’ experience. However, we usually can choose on which aspects of an artwork, design object, or face we concentrate when we perceive and experience it aesthetically.

Some of the proposed studies allow for choices: In study 3, the subjects choose on which character in a literary work they want to focus; in study 4, they decide which intentions they attribute to characters. By doing so, they make choices which can be investigated (e.g. by comparing them with the aesthetic preferences of the subject, or with the results of a personality test). Furthermore, the subjects have different aesthetic experiences when they concentrate on, and empathize with, different characters; the resulting differences in emotional experience can be compared and investigated with traditional methods (questionnaire) or with neuroimaging techniques.

Closely connected with limitation (3) is another problem: Experimenters most often asked for spontaneous, non-reflective judgments of aesthetic quality or personal preference, which only covers a small part of our daily aesthetic choices, where we might spend minutes in reflection or conversation before an artwork, or even days in evaluating new furniture or a house we consider to buy. And sometimes we do not judge at all, but react in a completely different manner to an artwork, interior design, or landscape; for example by feeling and describing an atmosphere it evokes, or a complex experience it allows us. Therefore, a further limitation can be formulated:

(4) Empirical aesthetics has to go beyond spontaneous aesthetic judgments and move towards acknowledging different kinds of aesthetic experience, including atmospheres (cf. Böhme 1995; Debus/Posner 2007), personal experiences, and interpretations of aesthetic stimuli.

If one looks at the literature in experimental aesthetics, the tendency to reduce aesthetic experience to direct aesthetic judgments is obvious. Even if multidimensional evaluations are demanded (e.g. with a method based on the semantic differential; cf. Osgood et al. 1957), subjects are asked to give them directly after their aesthetic experience; furthermore, they have to reduce their aesthetic experience to verbal labels which they judge as more or less suitable.

EEG and fMRI imaging studies, on the other hand, are sometimes supposed to enable us a "direct look into the brain"; in reality, only limited and often rather general hypotheses have been checked with these techniques. Since it is currently not possible to relate complex experiences to brain imaging results, connections between neuronal activation patterns and straightforward aesthetic judgments or emotional reactions are the best we can hope for. The complexity and multidimensionality of aesthetic experience still seems elusive.

But it does not have to remain so. New study designs can be developed, including methods which have successfully been applied in other areas of empirical research. How is aesthetic perception of literature influenced by differences in empathy (study 1)? What difference does it make when different characters are chosen to empathize with (study 2), and how do reader's make this choice (study 3)? Does the reader's personality influence which intentions s/he attributes to the characters (study 4)? Is personality a factor that stylistically influences a writer, enabling readers to glean information about a person out of his or her writing style (study 9)? Do people employ different strategies for aesthetic judgment (study 12)? Asking these and comparable questions will be a first step towards acknowledging the diversity of aesthetic experiences.

(5) Whereas aesthetic reception processes were often investigated, aesthetic production processes were only rarely studied in controlled experimental settings.

Experimental Aesthetics has, for the most part, concentrated on processes of aesthetic reception. To overcome this limitation, researchers have to study production processes, to connect results about aesthetic production and aesthetic perception in a systematic fashion. In the long run, they should be integrated into a theory of aesthetics encompassing production and per-

ception processes, which are linked by cognitive processes, personality factors, individual experiences, and socio-cultural influences.

Certainly, it is much more difficult to study processes of aesthetic production, which are more complex and take place over much longer time spans than reception processes, and cannot be reduced to intentions that we could simply ask for in questionnaires. With today's methods and technical means, however, it is possible to investigate processes of aesthetic production in more detail. The studies 9, 10, and 11 (cf. section 3.2) concentrate on different aspects of aesthetic production processes.

(6) Stimuli in different cultural areas (music, literature, art, architecture, performance) have usually been studied separately. Style, however, is an aspect of artworks and artefacts that exists in all these areas of culture, and can be used to study cross-modal influences between them.

Many artworks are multimedial (cf. Hess-Lüttich/Schmauks 2004) or multimodal (e.g. film with music and speech). "Multimodality" in a narrow sense refers to different sense modalities involved in sign processes (e.g. visual and auditory perception). However, "multimodal" is often also used in a wider sense (cf. Fricke 2012: 47f) including different interacting semiotic modes or "codes" (e.g. music and speech in a radio feature, or images and written text in a comic). The studies 7 and 8 target cross-modal interactions between styles. –

To summarize: The two proposed research projects, apart from testing specific hypotheses, are designed to address the six limitations outlined above. For each study series, six studies have been developed, which might undergo further changes. The proposed topics and methods will be updated an refined as the projects go on. The experiences and deeper understanding of methodology that will result from implementation of these studies should point towards further directions of research. In their entirety, the two projects will broaden the scope of Experimental Aesthetics in regard to topics and hypotheses, and point towards new perspectives and methodic solutions for the experimental study of style, empathy, and cross-modality.

3. Experimental part of the project

3.1 Project I: "Style, empathy, and personality"

The project investigates the influence of (cognitive as well as affective) empathy on the perception of style, and the role of personality in mediation of this influence; it focuses on films as well as literary works with recognizable narrative structures. In a recent study series (Siefkes (in preparation)), evidence for an influence of empathy on general aesthetic preference was found. A surprising effect was found that has never before been documented: When subjects, before rating each stimulus, were presented with a priming block of questions designed to evoke cognitive and affective empathy for the architect's intentions and emotions, they showed more acute perception of stylistic features, i.e. differences between two styles.

These results provide sufficient proof to assume a general influence of empathy level on aesthetic perception. The proposed project will investigate the role of empathy in aesthetic judgment in more detail. A further goal is to determine the influence of personality on aesthetic production of designers and artists, and the degree to which personality factors of artists can be guessed in aesthetic perception. Finally, it is well known that aesthetic styles can influence our affective and cognitive states; the project aims at a closer investigation of these effects, for example the influence of style on task choice and task performance.

Study 1: Empathy in the aesthetic evaluation of filmic or literary narrative

Hypothesis: Aesthetic preference for a film or literary text depends on the degree of empathy achieved with its characters.

Study design: As stimulus material, a corpus of films varying in length, genre, style, and time of creation is compiled (additionally, or possibly in a later study, a corpus of literary texts will be compiled and used). On the basis of a pilot study, questions are chosen that can be used as basis for a plausible measure of empathy. Questions might ask for intensity of emotion, degree of emotional involvement, and for naming and describing the emotions of the characters; further questions involving cognitive empathy (i.e. intentions of the characters) will be used. A measure for empathy is constructed on this basis, which is intended to measure the degree of emotional involvement readers feel in a different text, for one or more of the literary characters.

Subjects are asked to read the texts. They are asked to rate the aesthetic quality of the text, and presented with the questions chosen. On the basis of the developed method, a value for the constructed measure of empathy is calculated. The results are checked for correlations between general aesthetic preference for a text, and the degree of empathy the subject felt with the characters.

Analysis: In recent years, evolutionary explanations have been postulated for the development of human art in general (Menninghaus 2011), and literature in particular (Boyd 2009). Proposed mechanisms usually concentrate on evolutionary advantages of cognitive functions such as of storytelling, counterfactual reasoning, scenario planning, and play behavior. However, a further important element of reading literature is empathy for the depicted figures.

The role of empathy in the development of human social behavior has received considerable attention (e.g. Brener 2008). Possibly, the narrative structures developed in literature (and more recently, in film) hint towards an adaptation driven by the evolutionary advantages of learning empathy and intention attribution (cf. study 4) in risk-free simulated environments. In this case, the degree of pleasure derived from film and/or literature should be connected to its adaptive advantages, including how well a work allows us to empathize with its heroes.

Study 2: Empathy with different characters in films

Hypothesis: Viewer's experiences and aesthetic evaluations of a film differ according to which character they select to empathize with.

[The study can also be conducted with literary works as stimuli, or with paintings depicting settings with a number of clearly distinguishable persons, e.g. depictions of mythological scenes.]

Stimuli: A stimulus set consisting of film scenes and complete short films, comprising different genres, is compiled. Scenes are selected that can at least to a certain degree be understood independently. An important selection criterion is that the stimuli contain at least two characters (c1 and c2) displaying distinctly different emotions (such as anger and fear; sadness and happiness; hope and despair; etc.).

Study design:

Phase 1: The visual stimuli are presented to subjects randomly separated into two groups (conditions), with two different task assignments: Both groups are asked to view the films and to concentrate on the perspective of c1 or c2, respectively. They are informed that they will be asked to answer questions on that person's possible intentions, emotions and perceptions afterwards. After reading, the subjects are given a questionnaire including a general aesthetic judgment and a number of semantic scales (cf. Osgood et al. 1957).

Analysis: If concentration on the two characters with different emotions (c1 and c2) leads to different aesthetic experiences, this would demonstrate the important role of empathy in film reception: We are not detached and objective 'judges' of general aesthetic qualities, but rather, our experience in viewing depends on emotions – not only our own emotions, but the felt emotions of characters and our identification with them. A similar hypothesis can be tested for the reception of literature, as well as for pictures (showing scenes).

Phase 2: The same design can be used (simultaneously or in a follow-up study) for an fMRI study design. Again, concentration of the subjects is guided on one of the two characters differing in emotional valence (c1 and c2). The different emotional valence of the reading experiences, depending on emotional stance of the person on which the reader focuses, is measured with fMRI.

Study 3: Personality and choice of empathy focus

Hypothesis: The personality of a film viewer / reader influences the choice of characters s/he empathizes with.

Study design: The same stimuli (films and/or pieces of literature) as in the last study are used. In this study, subjects are told that they will have to answer questions regarding feelings and decisions of either character c1 or c2, but only one of them. Thus, the subjects are given the choice on which character they want to focus, choosing between c1 and c2, which differ significantly in emotional stance in the selected works or pieces of works. Afterwards, subjects are given a personality test.

Analysis: The results are checked for connections between personality traits and emotional stances of characters that are preferred to focus on and empathize with (e.g. will a viewer/reader who scores highly on neuroticism focus on a character with negative emotions, such as fear, anger, or envy?).

Study 4: Intention attribution and personality in film

Hypothesis: The personality of a film viewer influences the intentions s/he attributes to the characters.

Study design: A new set of stimuli will be compiled that encompasses narrative scenes of films where the characters' actions leave room for different interpretations and intention attributions. The subjects are asked to view the film scenes and to identify the intentions of two designated characters (c1 and c2). In addition, the subjects are given a personality test. The results are checked for regularities linking personality traits and intention attribution.

Analysis: It is plausible that a reader's personality influences to a certain degree which intentions he or she attributes to the characters (in cases where the narrative structure allows different attributions). We might expect that some personality traits influence how characters are perceived, their motivations explained, and their actions underpinned with intentions. Will a film viewer who scores highly on one personality trait, for example on neuroticism or on extraversion, attribute intentions which are traditionally linked with this personality trait, such as risk avoidance or attention seeking, respectively? If such connections were found, a link between personality and intention attribution would have been established.

Study 5: Influence of genre on cognitive task performance and task solving strategy

Hypothesis: Reading literature of different genre (and thus type of content) influences how readers (or viewers) deal with, and how they perform at, different kinds of tasks afterwards.

Study design: Subjects are randomly assigned to two (or more) groups, corresponding to experimental conditions, which are presented with works (literary as welland/or films) of different genres. Genres might comprise "love story", "horror story", "children's tale", "social satire", "science fiction", etc.

After reading, subjects are presented with either a creative or an analytical task (see study 6 for details; however, tasks might be differentiated further between mathematical exercises, logical tasks, verbal riddles, story writing, drawing exercises, etc.). Tasks have to be measureable in terms of performance.

Task performance is then compared for the different conditions (which were primed with different literary genres). Furthermore, measurements for task solving strategies will be developed (e.g. distinguishing between trial-and-error or step-by-step-strategies, and strategies based on prior cognitive modeling of the problem). Then, it can be analyzed if priming the subjects with literature belonging to different genres influences which type of strategy they employ, and how effective they are at implementing it.

Analysis: If differences between literary genres have an influence on cognitive task performance and task solving strategy, this fact would prove a behavior regulation effect of literature. Such effects have been shown for colors (Mehta/Zhu 2009) and it is conceivable that they exist for literature, too. Stated more generally, it would bolster evolutionary hypotheses for the development of literature (cf. Menninghaus 2011; Schrott/Jacobs 2011). Literature

would influence our cognitive performance in different tasks (probably by changing concentration, affective state, and attention); it would have to power to influence our daily behavior, and to prepare us cognitively for specific tasks, which would plausibly explain its adaptive function.

It is probably uncontroversial that reading literature can influence our general world-view and thus our long-term goals, a fact which already points toward possible adaptive functions of literature (such as enlarging world knowledge, enabling to choose between life options, etc.). The proposed experiment focuses on specific cognitive strategies for problem solving, which would have an influence on daily behavior, by influencing the mindset and cognitive strategies of readers. If such an influence could be proved, it would have profound consequences for evolutionary theories that posit an adaptive function of literature.

Study 6: Literary style and creative/analytical task performance

Hypothesis: Reading texts in different styles influences task performance for creative and analytical tasks.

Study design: A corpus of text segments of about equal length is compiled, including samples from literary authors with widely diverse styles, such as Robert Musil, James Joyce, Alfred Döblin, Thomas Mann, etc.). The subjects are asked to read these samples and to answer comprehension questions (to assure attentive reading). After reading, the subjects in condition 1 are given some tasks used to measure creativity, e.g. association tasks (Torrance 1974), the candle problem (cf. Snow/Farr 1987), the Guilford alternative uses test (Guilford 1967), or other established tests. The subjects in condition 2 are given simple mathematical and logical tasks. Conditions are fully crossed for the independent variables (styles and task types).

Statistical analysis is used to compare results for each style with the average of results over all styles (which are used as a control). For both task types, an influence of style is assumed if (a) the rate of solutions (in the allotted time) and (b) the average response time diverge significantly in opposite directions (e.g. higher solution rate and lower response time).

Analysis: If the results support influences of styles on task performance, a plausible explanation might be an influence of style on mental attitude. Furthermore, if specific styles influence task performance in different ways (e.g. some enhancing creative, others analytical task performance), specific effects of style can be inferred: For example, associative and fragmented styles (e.g. James Joyce) might induce a mental attitude suitable for creative tasks, whereas styles characterized by high syntactical and lexical complexity (e.g. Thomas Mann) might induce an attitude suitable for analytical tasks.

Though such results might not be very surprising, they would experimentally prove the cognitive influence of style, and prove the significance of different writing styles, as well as style-related reading decisions, depending on context. The *stylistic* dimension of literature would have been proved to influence the way we think and act, which is not a foregone conclusion.

3.2 Project II: "Style production, variation, and cross-modal influences"

The second research project focuses on the interactions between different modalities. The term "modality", as well as the derived term "multimodal" describing the integration of different modalities, can be used in a narrow sense, for situations where different sensual modalities such as visual, auditory, and haptic perception are involved. Furthermore, "modality" is often used in a wider sense (cf. Fricke 2012: 47f) including different interacting semiotic modes or "codes" (e.g. music and speech in a radio feature, or images and written text in a comic). However, in multimedial and multimodal contexts, semiotic interactions and influences between the different media occur which cannot simply be explained as combination of unimedial or unimodal contexts, and have to be understood in their semiotic properties (Hess-Lüttich/Wenz 2006).

Interactions between modalities (in both the narrow and the wide sense) will be investigated in the proposed project. Experimental Aesthetics has usually investigated different semiotic modes, as well as sensual modalities, separately, which due to the rapidly rising frequency of multimodal artworks and artefacts is no longer sufficient. Thus, many studies on auditory perception of musical pieces as well as on visual perception of pictures have been conducted, but very little research has been done on interactions when both types of stimuli are combined (e.g. in film, or an art gallery where background music is playing).

Study 7: Cross-modal congruence between style preferences

Hypothesis: Preferences for styles such as 'baroque', 'classical', and 'modern' are correlated between different modalities.

Method: Subjects are presented with style examples from different historical periods, e.g. 'baroque', 'classical', and 'modern', and asked to rank them in order of aesthetic preference. This is repeated for groups of stimuli from different modalities (e.g. architectural, pictorial, musical, and literary style). The modalities are presented in randomized order, to avoid priming effects. The rankings of each subject are checked for correlations between modalities.

Analysis: If correlations are found, a "cross-modal correspondence effect" might be posited: On average, then, a subject who prefers baroque music – e.g. Bach – over classical music – e.g. Mozart – will also prefer baroque over classical architecture. This effect would be an indirect validation for the concept "epoch style" ("Epochenstil"; cf. Por 1982; Siefkes 2012: 415ff), which proposes a cross-modal grouping of styles according to epoch or time. If the effect exists, further studies (e.g. involving a "semantic differential" method; cf. Osgood et al. 1957) might be employed to find which similarities and differences are perceived between styles in different modalities, leading to cross-modal congruence between styles.

An interesting possibility is that such an effect exists between *some* modalities (e.g. architecture and music), but not between others (e.g. music and literature). If this turns out to be the case, some modalities are closer to each other than others, at least in terms of aesthetic preference.

Study 8: Style and cross-modal influences: an fMRI study

Hypothesis: Styles in different areas of culture (e.g. literary, architectural, and musical style) interact in perception.

Study design: In condition 1 and 2, short literary texts representing a range of epochs and styles are read to subjects in an fMRI scanner; they are asked to concentrate on the texts and to judge them aesthetically. Subjects in condition 1 hear music playing via headphones (which is necessary due to the noise level of the fMRI scanner), they are told that the music is for relaxation; subjects in condition 2 hear no music; subjects in condition 3 only hear the musical pieces (they are told that they should relax, and will be given stimuli to judge later). Condition 1 is further partitioned in two subgroups, where styles of the musical pieces are either congruent with the literary styles (e.g. 'baroque' in both cases), or incongruent (e.g. 'baroque' music for a literary text deemed to belong to the classical epoch style).

Analysis: Of specific interest is the interaction of brain activation patterns, when stimuli from different modalities are combined. The activation patterns found in condition 1 and in condition 3 are overlaid, and compared with condition 2. Obviously, some deviations are to be expected, due to the fact that the cognitive load is higher when two modalities (texts and music) are processed. However, specific deviations might be found over different stimuli, showing how the music influenced the aesthetic perception of the texts (e.g. it might reinforce emotional responses on the texts, or mitigate them).

Interesting results can also be expected from the different combinations of style and music in the subgroups of condition 1: Do congruent cross-modal style combinations lead to activation patterns different from incongruent combinations, e.g. to less deviation from the overlay of conditions 1 and 3? If this is the case, we could postulate that congruence enables the brain to process both stimulus types without much interference, whereas incongruence of styles leads to some type of cognitive dissonance.

Study 9: Writing style and personality

Hypothesis: Measurable connections exist between personality and style of writing.

Study design: Subjects are randomly assigned to a writing group and a reading group. Subjects in the writing group are presented with short film scenes or comic strips, and are asked to describe these (with a fixed word and time limit). The resulting texts, therefore, are controlled for content, length, speed of writing, and context factors such as room atmosphere. The subjects are then tested with a standardized personality test (e.g. the "Big Five"; cf. McCrae/John 1992).[3]

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[3] Optionally, the writing group might be separated into laypersons and experts, writers who have already published literary works. The applicant is acquainted with the organizers of the "Lettrétage", a publisher and literary event house in Berlin, and could employ mailing lists etc. to find published writers as participants. Writing experience might make a difference in this experiment, since professional writers are probably better in constructing 'implicit writers' and intentionally creating impressions through their style.

The reading group receives the texts of the writing group, in randomized order. They are informed that the content was determined by the task, and are asked to guess the personality of the writers on a questionnaire matching the scales resulting from the personality test (e.g. to situate their personality on the five scales of the "Big Five" test).

Analysis: The aim is to find significant influences of the test results for the subjects in the aesthetic production group, and the guesses of the subjects in the aesthetic judgment group. This is possible with multifactorial analysis of variance (ANOVA), where the measured personality traits of the designers are taken as factors for which a possible influence on the guessed personality factors is measured. This has the advantage that indirect influences and interactions can be measured (for example, an influence of the personality factor "extraversion" on the guess for this personality factor might depend partly on the values of other factors, such as "conscientiousness" or "neuroticism", which interact with perception of this factor).

Background: Styles are often assumed to contain information (Ackerman 1962; Thoma 1976; Siefkes 2012: 109ff); writer personality is one obvious aspect of this information. If the hypothesis is confirmed for specific factors of personality (e.g. extraversion), these can be tested in detail in a follow-up study employing a more fine-grained personality test.

Apart from personality, further studies could investigate if information about other factors is contained in styles (e.g. social background, profession, age, gender, or level of education).

Study 10: Style production and mental activation patterns (fMRI study)

Hypothesis: Differences in writing style can be observed with brain-imaging techniques.

Study design: The same basic design as in the last study is used (both studies might be combined and implemented at the same time). The subjects in the production group are asked to write short stories (e.g. of 100 words) on the basis of (1) a one-page non-verbal comic strip or (2) a short film scene without verbal language and with a simple storyline, and are asked to do so in an fMRI scanner. The activation of different brain areas is measured and aggregated (the details will have to be worked out; the most simple solution would be to average activation strengths over time of writing, but other measures, such as activation maximum for each area, will also be considered).

The reading group evaluates the stories with a questionnaire, including general aesthetic judgment and evaluation on a number of semantic dimensions (such as 'simple – complex' or 'emotional – unemotional'), which have been tested as effective for style differentiation in a preparatory study (relevant dimensions have to vary sufficiently between styles).

Analysis: Results of the fMRI scans and the evaluation (by the reception group) will be compared. All subjects have to verbalize the same simple storyline, which reduces differences in content; the resulting differences between the subjects might be connected with general personality factors and/or ways of solving the writing task, which in turn might be partly observable as style. If different brain activation patterns are found, these will be compared with the style evaluations of the reading group.

To take an example: A correlation might be expected between activation of emotion-related brain areas (limbic system) and a writing style perceived as 'emotional', 'impulsive', etc. If the style is evaluated as above-average on the poles 'analytical', 'complex', or 'rational', this might be connected with activation of right parietal areas and/or frontal lobes, which are traditionally connected with mathematical thinking.

It should be pointed out that style is only one factor of writing, and cannot be completely separated from other factors when writing processes are investigated with brain-imaging techniques. However, by giving the same non-verbal storyline as input and asking subjects to adhere to it in writing, between-subjects differences due to content can be significantly reduced. Differences in activation patterns can now plausibly be traced to differences in writing style (including general differences in personality, e.g. higher general emotionality of one subject than the other, which will show up on the fMRI scan, but might also influence the subjects' writing style).

This is a difficult study design with uncertain results, but should be worth the effort. The visualization of style production and reception processes in the brain has remained elusive, and the proposed study would constitute a first step towards 'seeing style at work' in neural activation patterns.

Study 11: Style production and personality in design sketches

Hypothesis: The style of a design sketch contains information about the personality of its creator.

Study design: The subjects in a first group need to have some design experience; for example, they might be students of a design university. A cooperation with Prof. Arielli at IUAV Venice is considered for this study. The study design is identical to study 9, only with design sketches as stimuli.

Analysis: The analysis is more or less as in study 9, with a different type of stimulus. It is tested if information about styles can be gleaned from design sketches. (In fact, a pilot study done at the IUAV Venice in 2012 strongly indicates that it does, but this study used a small number of subjects and its results cannot be generalized.)

Study 12: Strategies and individual differences of aesthetic judgment

Hypothesis: When we perceive, appreciate, or judge aesthetically, we use different methods and strategies.

Study design: Currently, aesthetic perception is often understood in a simplified manner, and reduced to direct aesthetic judgments or evaluations of specific dimensions (e.g. 'simple – complex'). In reality, however, aesthetic perception and interaction is much less uniform. For a realistic model of aesthetic perception and judgment, we have to consider individual variation.

For this study, we assume three different strategies of judgment, which are supposed to be adopted intuitively and non-uniformly by different persons: (1) Comparison with other cate-

gory members; (2) the comparison with a paragon used as a benchmark for aesthetic judgment; (3) the definition of dimensions deemed to be relevant, as aesthetically salient properties of the stimulus/object.

The study can be repeated for different stimulus types, e.g. pictures, musical pieces, films, and texts, and the results can be compared to find out if different strategies are employed in different areas of artistic production.

Participants are asked to rate pictures, musical pieces, and/or texts of different styles and epochs (e.g. Romantic, Impressionist, Abstract). Then they are given a questionnaire asking

(1) if, when asked for an aesthetic judgment, they compared the picture (or musical piece, film, text) to other stimuli of the same type;

(2) if they used one or more other pictures (or musical pieces, film, texts) as reference or paragon for judgment;

(3) if they considered specific properties that seemed to them important for aesthetic quality, and if this was the case, to name them (e.g. 'formal clarity'; 'social or political relevance'; 'intelligible content').

Analysis: It is measured (a) if subjects consistently prefer some of the three proposed strategies, or if they change them depending on the style (e.g. employ other strategies for classical vs. modern art), and (b) the degree of variation between subjects in their preferences for different strategies. An answer to question (a) will tell us if aesthetic judgment strategies depend on style; question (b) will allow us to infer how important interpersonal differences are.

The study can be repeated for different stimulus types, perceived through different sensual modalities (auditory, visual, and even haptic perception). In this way, similarities and differences between judgment strategies in these different modalities can be found.

4. Outlook

Experimental Aesthetics is a comparatively young discipline in rapid development, undergoing rapid growth and development, and sometimes surprising changes of direction and interest. A thorough analysis of recent developments in Experimental Aesthetics, including its current strengths and possible weaknesses, can help to find promising areas for future research. The analysis proposed in this paper (cf. section 2) concludes that some research areas, methods, and types of stimuli have been mostly neglected in Experimental Aesthetics. On this basis, two extensive research projects were proposed that, although focusing on specific topics in experimental aesthetics (empathy; cross-modality; and the experimental study of style), take into account the stated limitations, and try to develop approaches to overcome them.

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