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Where Does It Come From? Developmental Aspects of Art Appreciation

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Abstract

Art is a unique feature of human experience. It involves the complex interplay among stimuli, persons and contexts. Little is known of how the various features deemed important in art appreciation depend on development, thus are already present at a young age. Similarly to our previous approach with adults of differing levels of expertise, the present study uses structural equation modeling to explore this complex interplay by analyzing differences in the appreciation of classical, abstract and modern artworks by children of two age groups. We measured evaluations of perceived beauty, elicited emotions, arousal and understanding. Structural equation solutions for children not only revealed significant effects of emotion in all conditions, but also confirmed that the dependencies between emotion and liking were consistently higher for younger children, while the interactions of arousal and liking, as well as understanding, were higher for older children. These results are in accordance with a transition from an affective towards an increasingly cognitive knowledge based sense of aesthetics, but underline the importance of emotional processing as fundamental.

Keywords

Childhood development, cultural exposure experience, art appreciation, culture

Development of Art Appreciation

Art is among the most fascinating aspects of human life. Art production and appreciation seem universal and are observed in all cultures, and various explanations about its functions have been posited. Dissanayake (2007) distinguished explanations why art emerged in the course of evolution, from bonding between mother and child, to developing rituals, providing positive emotions and fostering good decisions. She also believed that it is a specific feature of art that most children like it. Moreover, many explanations for the reasons why art exists refer to the rewarding function of art perception (Chatterjee, 2013), or how art fits the way the brain works (Ramachandran & Hirstein, 1999). However, there is hardly any aspect of our everyday perception that seems more subjective than our aesthetic appreciation. It is widely assumed that art preference is subjective, as it is affected by private—often assumed undisputable—taste.

Although art appreciation is often advanced as an example of highly subjective experiences, empirical research led to an increased understanding of its nature. Historically, three major influences on the cognitive role in experiences have been identified. Freeman and Parsons (2001) explicitly name Arnheim (1969), Gombrich (1977), and Goodman (1976), who all focused in “an exclusive way on the visual character of cognition in art”. According to Arnheim (1969) visual perception involved in art perception is fundamentally cognitive because it requires processes such as selection, focusing, and abstraction, which he summarized as visual thinking. Regarding the representations of real world aspects in art Gombrich (1977) taught us to “understand the making of representations not as simple copying but as the gradual invention of functional equivalents, as a process of matching the visual effect of our efforts with the visual effects of what is to be represented” (Gombrich, 1977, p. 88). This essential feature

of what art provides is in line with Piaget (Piaget & Inhelder, 1956) regarding the essential role of representation as an important feature in cognitive development. Similarly, Goodman (1976) studied the transfer processes from reality into artistic media involved in the understanding of art. These approaches discuss elements that are relevant during children’s cognitive development, and could therefore be studied in the realm of art perception. However, Freedmann and Parsons (2001) concluded that “It seems fair to say that the systematic study of the understanding by children of artworks remains relatively undeveloped” (Freeman and Parsons, 2001, p. 89), for example, regarding the assumption that artworks represent emotions.

Here we propose a research approach closely related to the recent psychological theories that aim to describe and explain art appreciation in adults (e.g., Chatterjee, 2003; Chatterjee & Vartanian, 2014; Leder, Belke, Oeberst, & Augustin, 2004). Our stage model of aesthetic experiences of art emphasizes higher-order cognitive processes, such as finding meaning and interpretation (Leder et al., 2004). The model describes five essential stages of information processing, and a number of variables that affect aesthetic judgments as well as aesthetic emotions concerning art. The aforementioned stages can be roughly described as perceptual processing, implicit-memory-related processing, memory-related identification of content and style, understanding and classification, and,

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finally, evaluation. All stages of information processing feed into a continuously evaluated emotional state, developing as a continuously adapted by-product of the aesthetic processing stages (Leder et al., 2004, p. 502). According to the model, and shared by other approaches (Chatterjee, 2003; Chatterjee & Vartanian, 2014), an interaction between cognitive and emotional processes accounts for the aesthetic experience of art. Tinio (2013) presented an extension of these approaches in which stages of information processing are put in relation to stages of art-production, proposing a theory of a mirror relationship of the two aspects of art, production and perception. However, the way that these components interact is an exciting question for research in empirical and neuroaesthetics (Chatterjee, 2012; Leder, 2013; Nadal & Skov, 2013).

The interplay of top-down orienting of attention and bottom-up perceptual facilitation was supported by a functional magnetic resonance imaging (fMRI) study regarding art perception (Cupchik, Vartanian, Crawley, & Mikulis, 2009). However, the interplay amongst cognitive and emotional processes in aesthetic appreciation is still not fully understood. Therefore, in another study we showed how analyzing art experiences by means of structural equation modeling allows to systematically study this interplay of cognitive as well as emotional variables (Leder, Gerger, Dressler, & Schabmann, 2012). We measured preferences for different kinds of art as well as evaluations of elicited emotional valence, arousal and understanding. We tested a large population of 136 participants and used structural equation modeling (SEM) to simultaneously analyze these features of aesthetic experiences (MacCullum & Austin, 2000). SEM indicates the relative weight of each variable (valence, arousal, and understanding) and reveals the interplay of these variables affecting the dependent variable (liking). Our analyses revealed “strong effects of emotion in all conditions” (Leder et al., 2012, p. 2). We also studied differences in level of expertise. In our study, we found that the inter-correlations between emotion and understanding were consistently higher for non-experts. Moreover, people with higher expertise provided higher ratings on all scales. We interpreted this as reflecting experts’ greater flexibility and differentiation in art appreciation.

Issues of longer-term changes, such as those effects of expertise, are particularly interesting from a developmental perspective. Expertise consists of acquired knowledge and accumulation of experiences which will increase over time, in the course of development. Augustin and Leder (2006) found evidence for the hypothesis that with higher expertise the likelihood of style-related processing is greater. Leder, Gerger, Brieber, and Schwarz (2014) showed how experts and non-experts differ in their responses and evaluation of contemporary artworks, and especially those that depict negatively valenced content. There is also some evidence that expertise changes the preference for abstract as opposed to representative art (Gardner, Winner, & Kirchner, 1975; Machotka, 1966). These findings reveal how aesthetic responses are associated with emotions and modulated by expertise. Furthermore, our stage model is also in accordance with recent results of creativity research. Within the framework of consensual assessment technique it was shown that experts reveal higher values of inter-rater agreement than novices for various artistic works (e.g., Kaufman & Baer, 2012; Kaufman, Baer, Cropley, Reiter-Palmon, & Sinnott, 2013). According to the stage model the higher reliability of expert ratings can be explained by the advanced knowledge about the inherent “top-down” elements of artworks, for example style, classification (see also Tinio, 2013).

Nevertheless, only little research attempted to explain how the general structure underlying art appreciation develops over time, for example with age and acquired expertise. Therefore, a developmental perspective could be informative and reveal whether and how emotional and cognitive variables influence aesthetic appreciation in children of different age. There are at least two possibilities: either variables influencing aesthetic appreciation could be relatively stable due to a fixed combination of features present in the artworks and the human beholder, or they change with age. Changes could be due to more formal art instruction in school and informal “instruction” provided by the parents, such as visiting museums, seeing films, or reading art-books. In order to address this question, we employed a similar design as in Leder et al. (2012) and adopted it to be suitable for children. Therefore, we tested whether two different age groups of children, kindergarten (age 4–6) and primary school children (age 9–11) respond to art in a similar (or different) manner as adults do, and whether developmental changes occur between the age groups.

Developmental Aspects of Aesthetic Appreciation

There are some previous studies that addressed the question of how aesthetic appreciation develops. In a mostly descriptive attempt, Parsons (1987) proposed five levels of development based on interviews with people of different age. He identified five stages: *favoritism*, at which dominant criteria to like paintings are color and content; the stage of *beauty and realism*, at which liking is determined by recognizable, realistic content; the stage of *expressiveness*, concerned with the expressed mood of the painting; a stage called *medium, form and style*, in which aesthetic preferences are determined based on knowledge and awareness about the application of the three means; and finally a fifth stage, *autonomy*, in which the aesthetic quality depends on the embedment of the artwork evaluation, in a broader context and generalized meaning. These stages are not closely linked to age levels, but can be used as a frame of reference regarding different evaluation styles in dealing with art. Machotka (1966) found that among children of about seven to eight years, art preferences are mostly based on subject matter (i.e., the depicted topic) and color. Moreover, Freeman and Parsons argue that children of that early kindergarten age “do not appear to think of the marks they make as representations” (2001, p. 78). From ages seven until 11 the realism of depiction showed to be most important, and design principles such as contrast, harmony and artist style were the determining criteria for preference beginning at age 12. Moreover, according to Machotka, “Later levels of evaluation are added to the earlier, but do not replace them” (1966, p. 877). Gardner (1972) on the other hand reported that after training, style sensitivity can even be observed in seven-year-old children.

The few studies concerned with the way children perceive and like art often distinguished abstract from representative art. For example, Gardner et al. (1975) found that four- and five-year-old children prefer abstract paintings, because they reported to see no trouble identifying whatever they assumed to be depicted. They assigned some content, and liked the artworks. Around the age of six or seven, a tendency towards representational art was observed, because such artworks are more realistic and look more similar to reality (Machotka, 1966). So around this age, the depictive nature of art seems to emerge as a criterion for quality. A similar dissociation was reported by Taunton (1980), who found that four-year-old

children preferred the least realistic, while eight-year-olds preferred the most realistic paintings. A strong preference for realism from age six to 10 was also supported in a study by Trautner (2008). Freeman and Sanger (1995), for 11-year-old children, reported that 10 out of 12 children agreed that if you painted something ugly the picture would be bad because it would be an ugly picture, indicating a lack of insight into the relation between artwork, painter, and the receiver. Hence, there is much agreement with Lark-Horovitz, Lewis, & Luca (1967, p. 224): “Only during adolescence does a true aesthetic attitude break through”. However, Taunton (1982, p. 106) also argued, that “Observations and research are beginning to indicate that we underestimate young children’s capabilities.” In the present study we aim to shed further light on these underlying developmental processes.

The Present Study: Variables and Hypotheses

As in our previous study (Leder et al., 2012) we included three kinds of artworks systematically varying the level of abstractness. In the model by Leder et al. (2004), various processing demands depend on whether the artwork has a representational content or not. For example, it was argued that the effects of style are particularly dominant in abstract art, for which by definition there is no clear content. On the other hand, abstract art was also proposed to represent a universal class of images that could be understood by everyone, due to their lack of semantic content (Brinkmann, Commare, Leder, & Rosenberg, 2014). Higher-order interpretations, such as finding meaning, occur at later stages of information processing and often rather rely on depicted content. In the present study we measured the aesthetic appreciation of three different sets of artworks.

We used purely abstract compositions by, for example, Gerhard Richter and Fiona Rae (class called *abstract*); hyper-realistic modern collages by Jeff Koons and expressive depictive works by Georg Baselitz, which contain recognizable objects often in surreal configurations (called *modern*); and late 19th century representative paintings such as landscapes by Monet (called *classic*). This selection of art styles from representative to abstract can also help to uncover developmental changes in children (Gardner et al., 1975; Machotka, 1966). If children in our study are in the stage of *favoritism*, then they would be rather insensitive to the three different styles, because at this stage style is not relevant for aesthetic appreciation. Therefore, style sensitivity might be seen in the elder children (Parsons, 1987).

As in our previous study we measured four dimensions derived from theories of aesthetic experiences (see Leder et al., 2004): liking, emotional valence, arousal, and understanding. Liking is the dimension that best captures aesthetic responses, and is used to evaluate aesthetic appeal. Emotional valence and arousal capture emotional states that are deemed important in aesthetic experiences. Regarding emotional valence Silvia and Brown (2007) examined the conditions under which negative emotions occur in art appreciation. They presented participants with controversial contemporary artworks and found that in accordance with appraisal theories, anger was associated “with in-congruency with one’s values and as intentionally offensive, and disgust was associated with appraising a picture as incongruent with one’s values and as unpleasant” (Silvia and Brown, 2007, p. 100). For people who are inexperienced with art, often a positive correlation between perceived valence and

Table 1. Description of the sample.

	Kindergarten	School
Age, mean (SD)	5.07 (0.64)	9.92 (0.56)
Age, range	4-6	9-11
Boys (%)	25 (59.5%)	27 (51.9%)
N	42	52

preference is observed (Leder et al., 2012, 2014). Arousal, the amount to which the experience is energizing, is another aspect of emotion (Russell, 1980) and according to Berlyne (1970) determines the aesthetic response. However, empirical evidence for a preference of moderate levels of arousal has been rather inconsistent (see Hekkert, 1995, for a discussion). In Leder et al. (2012), arousal correlated positively with art appreciation, meaning that higher levels of arousal predicted higher preference. Whether children show similar relationships between liking, arousal, and emotional valence as adults do will be revealed by the present study. According to the model proposed by Leder et al. (2004), understanding, the subjective feeling of having grasped the meaning of an artwork, occurs in the later stages of information processing. These later stages are concerned with cognitive mastering, for example, finding meaning and interpretation, and are particularly related to expertise (Leder et al., 2004). This kind of understanding had strong effects in our previous study. If children have the same underlying structure determining their aesthetic preferences as adults, then we would expect to see strong effects of understanding. If it is not relevant for children then we expect weak effects of this variable on liking. This would be in accordance with Parsons’ (1987) processing stages of beauty and realism, in which expression and further interpretation play a minor role. Moreover, through the variation of style the present study will reveal whether modern or abstract paintings have a stronger need for interpretation (Gehlen, 1960) as was found in Leder et al. (2012) and whether this is also the case for children.

We tested two age groups—kindergarten (age 4–7) and school children (age 9–11). In Austria, in kindergarten, there is no systematic art-education although drawing and painting are frequent activities. In primary school, however, art-education is somehow more systematic, including different activities like painting and drawing in various techniques, reading art-books, and visiting museums. Therefore, our two age groups clearly differ in respect to art instruction, experiences and education and provide a critical comparison for our developmental hypotheses.

To summarize, in our study we compare two different age groups of children and analyze their art experiences with structural equation models. This analysis will reveal the interplay of relevant elements for aesthetic appreciation, their consistency and their dependence on developmental stages.

Method

Participants

In total, 94 children of two age groups were tested. The first group consisted of 42 kindergarten children (nursery), and the second group comprised 52 school children (Table 1). Participating children came from a district close to Linz (Austria; 200 000 inhabitants), where mostly middleclass families live. They were from

three different school classes, and five kindergarten groups. All parents had given consent that the studies could be conducted.

Stimuli

As in Leder et al. (2012) three classes of artworks were used: abstract (Hartung, Rae, Richter, van Velde), which consisted of complex, mostly colorful and very distinct examples of each painter; modern (Baselitz, Dubuffet, Koons, Lüpertz), with depictions of figures, partly abstracted, a human figure in Baselitz and Dubuffet, and Lüpertz (a soldier), and a collage-style bright painting by Koons; as well as classic paintings—an interior by Menzel, trees by Monet, mother and child by Renoir, and an interior with people by Signac. However, after discussions and an informal pre-test we decided to reduce the total number of paintings from 24 (two by each artist) to 12, by using one painting by each artist. These artworks were selected to have some resemblance in terms of color and gross level of complexity. However, they differed in degree of abstraction.

Procedure

All stimuli were shown in the order abstract–modern–classical to the children using a video projector. Prior to presenting the target stimuli an example was given to ensure that all children had understood the procedure. Every artwork was presented for approximately five minutes to make sure that all children could complete the questionnaire and rate the artworks respectively. Breaks were offered to the children when necessary, so the presentation took approximately 80 minutes. In school the procedure was completed in 60 minutes on average with one break. The images were presented by the fourth author, who also collected the data, supported by the kindergarten educators or the school teachers, respectively.

For the kindergarten children, scales were presented in an analog format, on which markers had to be moved to indicate values. The open question (see below) was part of the questionnaire for the school children, but verbal responses were written down for the kindergarten children. Children were tested in groups of two or three.

All participants received a printed version of the scale (a nine-point Likert scale with 1 = not at all, 9 = very much) and were requested to evaluate each artwork on four scales: (a) how beautiful is the artwork (liking), (b) whether they would assign it a negative (1) or positive emotion (9; emotional valence); (c) whether they knew what the artwork depicted (1 not at all, 9 very much; understanding), (d) whether they found it arousing (arousal). Importantly, regarding the emotion scales, it was explicitly stated that the children should reveal the emotion that the artworks elicited (“How one feels when looking at such an artwork”) and not what emotion it depicted. Also it was stressed that there are no correct or wrong answers, and that personal, subjective responses should be given. In addition to the ratings, an open format question had to be answered (“Why do you find the artwork beautiful?”).

Results

General Remarks

Kindergarten. Studying aesthetic responses of kindergarten children turned out to be difficult. Twelve images were a large set, children often lost concentration, and also started to tell stories in association with the artworks. Although they seemed to enjoy looking at and evaluating art, they sometimes lost track, and had to be

guided back into the sequence. Also, in accordance with Parsons’ favoritism stage, younger children tended to use extreme values on the analog scale. The answers why the artwork was considered beautiful also showed some gender biases, for example, when an armor was recognized (Lüpertz), the image was liked by boys, but not by girls. Interestingly, also the indication of certainty regarding the content often seemed either very sure or not sure at all.

School. Two patterns of responses seem noteworthy: in one of the classes knowledge about art was more elaborated. Here children responded with references to art history (“reminds me of Klee” or “cave art”) and explanations had a high level of abstractness (“I generally like blurriness in art”). Moreover, a large range of variation in the explanation of the level of beauty was discernible, ranging from “because I find it beautiful” to abstract statements that might have been learned from adults with no necessary insights (such as¹ “it is simple, but it is art”, “because it harmonizes, in such a free way”, “because it is in fashion”, “it is painted in a very creative fashion”).

Answers to the Open Format Questions

In sum the children gave 1258 answers to our open questions, kindergarten children gave 570, and school children 688 answers. Table 2 provides a summary of all answers. To compute the table, the children’s statements were categorized by two raters to one or more of the following categories: *color* (e.g., “. . . because it is red”), *content* (e.g., “. . . because there are many trees”), *atmosphere/impression* (e.g., “. . . because it is a sad scene”, “. . . because it looks funny”), *form/style* (e.g., “. . . because it looks like it was painted on wood”, “. . . because it looks so blurry”), *favoritism* (e.g., “. . . I like it, because there are dogs on it. I like dogs”), *realism* (e.g., “. . . because it looks like a photo”)², and *abstract statements* as aforementioned. In a first step, the raters categorized the statements independently. If a statement was not assigned to the same category, the raters discussed this case until they came to a consensus.

Table 2 reveals that the majority of answers referred to color and content in both groups. However, school children gave more answers of the atmosphere/impression category, in particular when modern artworks were presented. Answers of the realism and favoritism category were rare in both groups. Interestingly the kindergarten children gave abstract statements only for abstract artworks, whereas (some) school children also answered in this way when modern and classical artworks were presented.

Inter-rater Reliability of the Judgments

Both age groups have low levels of inter-rater reliability, indicating that their judgments are highly subjective. Also the intra-class correlations (ICC; i.e., the artwork-based variance proportions) are low (Table 3). Interestingly, both measures are somewhat lower for the older group (except ICC for liking and emotions). The zero-order correlations between kindergarten and school (mean) ratings range between .08 and .97 with remarkably higher correlations for modern and classical artworks than for abstract paintings.

Results and Discussion: Analyzing Evaluations

For the analysis means for each art style and age group were calculated so that a value of 9 indicated high liking, high arousal, high

Table 2. Categorized answers to the question “Why do you find the artwork beautiful?”

	Kindergarten				School			
	Abstract	Modern	Classical	Total	Abstract	Modern	Classical	Total
Color	93 <i>41.15</i>	57 <i>32.57</i>	40 <i>23.67</i>	190 <i>33.33</i>	64 <i>28.32</i>	30 <i>13.45</i>	30 <i>12.55</i>	124 <i>18.02</i>
Content	38 <i>16.81</i>	88 <i>50.29</i>	102 <i>60.36</i>	228 <i>40.00</i>	35 <i>15.49</i>	65 <i>29.15</i>	89 <i>37.24</i>	189 <i>27.47</i>
Atmosphere/impression	3 <i>1.33</i>	13 <i>7.43</i>	8 <i>4.73</i>	24 <i>4.21</i>	33 <i>14.6</i>	68 <i>30.49</i>	42 <i>17.57</i>	143 <i>20.78</i>
Form/style	23 <i>10.18</i>	8 <i>4.57</i>	12 <i>7.1</i>	43 <i>7.54</i>	22 <i>9.73</i>	15 <i>6.73</i>	36 <i>15.06</i>	73 <i>10.61</i>
Favoritism	1 <i>0.44</i>	5 <i>2.86</i>	3 <i>1.78</i>	9 <i>1.58</i>	1 <i>0.44</i>	5 <i>2.24</i>	1 <i>0.24</i>	7 <i>1.02</i>
Realism	2 <i>0.88</i>	3 <i>1.71</i>	3 <i>1.78</i>	8 <i>1.40</i>	5 <i>2.21</i>	6 <i>2.69</i>	11 <i>4.6</i>	22 <i>3.20</i>
Abstract statements	66 <i>29.20</i>	1 <i>0.57</i>	1 <i>0.59</i>	68 <i>11.93</i>	66 <i>29.20</i>	34 <i>15.25</i>	30 <i>15.25</i>	130 <i>18.9</i>
Total	226	175	169	570	226	223	239	688

Note: Description of the categories: naming of colors and/or colorfulness (color); statements about the content of the painting, e.g., “many trees”, “a face” (content); statements about the atmosphere/impression, e.g., “a sad scene”, “funny” (atmosphere/impression); statements about the style or form, e.g., blurriness (form/style); statements concerning individual preferences (favoritism); references to realistic elements, e.g., “looks like a photo” (realism); abstract statements, that might have been learned from others, e.g., “it is simple, but it is art” (abstract statements). Frequencies are depicted in bold, and column-percentages in italics.

Table 3. Fleiss kappa and intra-class correlations for the four dimensions. Comparison of kindergarten (KG) and school children. Correlations between kindergarten and school (mean) ratings for abstract, modern, and classical artworks.

Dimension	Fleiss kappa		Intra-class correlation		Kindergarten–school correlation		
	Kindergarten	School	Kindergarten	School	Abstract	Modern	Classic
Arousal	.43	.20	.59	.20	.08	.82	.97
Emotion	.44	.25	.14	.23	.19	.79	.61
Liking	.38	.21	.01	.10	.56	.98	.85
Understanding	.50	.16	.37	.10	.54	.85	.93

knowledge and positive emotions. Mean ratings for all dimensions are shown in Figure 1.

As Figure 1 reveals, children in kindergarten gave very similar evaluations of all three styles, in three of four variables (liking, emotion and arousal). Figure 1 also shows a strong effect of understanding. Understanding decreased with abstractness and was much lower for abstract compared with classic and modern artworks. Moreover, for abstract artworks the values were higher for school children. We analyzed these data in four separate ANOVAs (for mean liking, emotion, understanding, arousal ratings), all with style (classic, modern, abstract) as within, and age group (kindergarten, school) as between factor. All means were sampled over participants.

Beauty

Analyses of the beauty ratings revealed a significant main effect of *style*, with $F(2, 184) = 12.00, p < .001$, partial $\eta^2 = .115$; abstract art was found most beautiful, followed by modern and classic. There was no main effect of *age group*, $F(1, 92) = 3.41$, but a significant interaction between *age group* and *style*, $F(2, 184) = 10.89, p < .001$, partial $\eta^2 = .106$. Although all children found abstract art to be the most beautiful, school children showed stronger differences between the three styles (Figure 1). To break down this interaction, contrasts were performed comparing abstract and modern

artworks to classical ones (reference category) across kindergarten and school children. These revealed significant interactions when comparing kindergarten and school children’s scores in abstract with classical art, $F(1, 92) = 18.17, p < .001$, partial $\eta^2 = .165$, indicating that school children rate abstract artworks significantly as more beautiful than classical ones, while the scores of kindergarten children remain the same for all three types of art.

Emotion

Analyses of the mean emotion ratings revealed no main effect of *style*, with $F(2, 184) = 2.21$ and only an effect by trend for the interaction between *age group* and *style*, $F(2, 184) = 2.395, p = .09$ (indicating less positive emotions for school children for modern and classic artworks). There was only a significant main effect of *age group*, $F(1, 92) = 7.98, p < .01$, partial $\eta^2 = .08$, indicating that kindergarten children displayed more positive emotions.

Understanding

Analyses of the mean understanding ratings revealed a significant main effect of *style*, with $F(2, 184) = 122.39, p < .001$, partial $\eta^2 = .571$; abstract art was found least understandable, followed by modern and classical art. There was no main effect of *age group*,

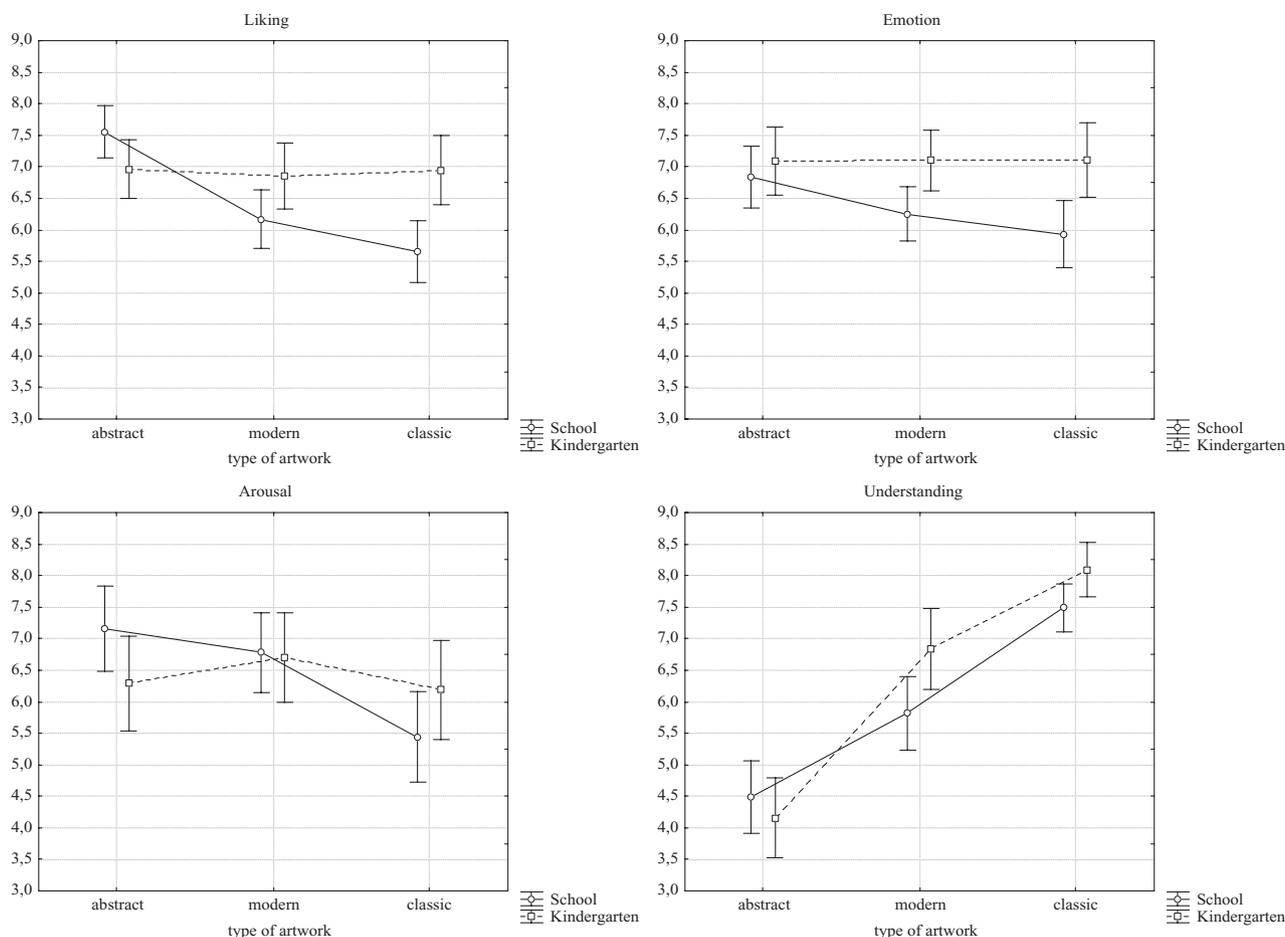


Figure 1. Mean ratings on all scales split by expertise and type of artwork. Vertical bars denote 0.95 confidence intervals.

$F(1, 92) = 2.11$, but a significant interaction between *age group* and *style*, $F(2, 184) = 4.85$, $p < .01$, partial $\eta^2 = .05$. Contrasts performed across the two age groups comparing abstract and modern artworks with the reference category (classical) revealed a significant interaction when comparing abstract and modern art, $F(1, 92) = 3.99$, $p < .05$, partial $\eta^2 = .042$ (Figure 1). This interaction suggests that understanding scores of kindergarten and school children are on a similarly low level for abstract art, but increase significantly for both groups concerning classical artworks, although children at kindergarten rate classical art higher in terms of understanding than school children do.

Arousal

Analyses of the mean arousal ratings revealed a main effect of *style*, with $F(2, 184) = 8.48$, $p < .001$, partial $\eta^2 = .084$, and a significant interaction between *age group* and *style*, $F(2, 184) = 4.92$, $p < .01$, partial $\eta^2 = .051$ but no effect of *age group*, $F(1, 92) < 1$. Kindergarten children assigned very similar values to all styles, while school children differentiated, with abstract > modern > classic. Performed contrasts with classical art as a reference category showed a significant interaction when comparing abstract and classical artworks, $F(1, 92) = 8.13$, $p < .01$, partial $\eta^2 = .081$. This interaction term suggests that the scores of school children decrease significantly when comparing abstract with classical artworks in terms

of arousal while scores of kindergarten children remain on the same level.

SEM Analyses

To analyze the relative influence of the predictors (emotion, understanding, and arousal) on the liking for art, we followed the procedure used by Leder et al. (2012). We conducted a series of two-group (kindergarten, school children) SEMs. The models were specified in terms of the main assumptions derived from the model of Leder et al. (2004). According to the model, understanding represents the outcomes of the cognitive processing stages, and emotion and arousal together represent the outcomes of the affective pathway. Both are thought to contribute to art appreciation measured here in terms of liking. Because this model has not yet been tested for children using SEM, we first specified a full recursive model in which all parameters were estimated simultaneously for the two age groups, but were allowed to differ. This model is shown in Figure 2.

Second, all parameters that were equal to zero according to their critical ratios (CRs; e.g., Byrne, 2001) were fixed to zero. A predictor was omitted if its effect on all other variables appeared to be zero (regardless of possible correlations with other predictors). This was the case for understanding of classical art. This reduced model was re-run, and the remaining parameters of the two groups were

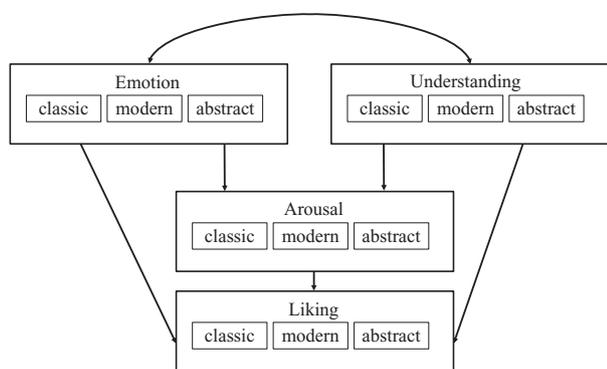


Figure 2. Theoretical (full recursive) structural equation model for the analysis of art appreciation.

compared using the critical ranges for difference (CR_{diff}) to see whether they were numerically the same for preschool and school children. Finally, parameters that appeared numerically equal for both groups were fixed to be equal. This model was compared with the previous model and a full-restricted model in which all parameters were set to be equal for both groups. According to the total model fit, the semi-restricted model (only some parameters different for preschool and school children) statistically showed the same fit as the unrestricted model (all parameters allowed to differ; $\Delta\chi^2 = 19.9$; $df = 15$; $p = .18$), but a poorer fit than the fully restricted model ($\Delta\chi^2 = 97.8$; $df = 26$; $p < .05$). This indicated that the semi-restricted model was preferable in terms of model fit and parsimony. Figure 3 shows the model which is the result of the optimization of the modeling process. It shows all the variables that were found to be effective in affecting liking of the artworks. Arrows indicate the direction of effects, with dotted lines representing effects found for both age levels and solid lines representing different effects with respect to age.

We also calculated the total effects, which are the contribution of the different factors to the liking of artworks. These values are shown in Table 4. Overall, the model explained about 50–70% of the variance for all paintings, except abstract paintings in the kindergarten group. Thus, it seems that the variables measured here significantly account for the aesthetic appreciation for different types of artworks.

Determinants of Liking for Art

Concerning the weight of the predictors, the analyses are clear. Emotion was a strong predictor of liking for all three types of artworks. Interestingly, this was most apparent for the modern artworks, and to a lesser degree for the abstract artworks, while for classical artworks a significant group effect exists (see below). This clearly indicates that children's emotion plays a role in cases of ambiguous modern artworks, which had representative elements without clear semantic representations. Only in these paintings did understanding have a significant (direct) effect. This is revealed in Figure 3 by the arrow from "understanding modern" to "liking modern". Liking of modern art was affected by both emotion and understanding.

Effects of Age

The SEM analyses found significant differences regarding age. The effects of age were generally consistent with the means (see Figures

1 and 2, respectively). They differed with age, with the effects being stronger for children in kindergarten in four out of the six analyzed comparisons of direct effects. For all styles the effect of emotion on liking was stronger for kindergarten children, indicating that they relied more on emotions when evaluating artworks, although this difference was significant only for classical artworks. Arousal on the other hand had a stronger effect for the older group. This effect was significant for all artworks, indicating that with growing age arousal becomes more important in the evaluation of artworks. Finally, a (direct) effect of comprehension was only significant for modern artworks and the school group. This indicates that with growing expertise understanding becomes more important for the evaluation of modern artworks.

Summary and Discussion

How can the findings be interpreted? First it is worth mentioning that both kindergarten and school children showed patterns of inter-rater reliability which are typical for novice raters. This is not surprising given the young age of both groups. There is a lot of work showing a lower inter-rater agreement for novice raters than for experts (e.g. Kaufman et al., 2013). Interestingly, the values are lower for the older group, somewhat contradictory to our expectations. Although these results have to be interpreted with caution, this might reflect a step of development in which ratings even become more subjective – possibly a consequence of informal (through visits of museums, reading books about art, etc.) and formal art-instruction. The kindergarten–school agreement was remarkably lower for abstract than for modern and classical paintings. One reason might be that abstract artworks are probably less popular among average young children. Similar patterns were found by Kaufman, Baer, and Cole (2009) and Kaufman, Baer, Cole, and Sexton (2008) for two domains of creative writing. They compared novice–expert judgments and found that poetry, which is probably less popular, showed a lower rate of novice–expert agreement than fiction, which is probably more popular. Insofar our results confirm the importance of domain specific aspects for the evaluation of artworks.

We found differences between age groups: while the younger group did not differ in its ratings of beauty and emotion between the different artworks, the older group considered abstract artworks more attractive than modern and classical artworks, and (by trend) also reported more positive emotions for these artworks. A similar picture was revealed concerning arousal. Kindergarten children assigned similar values to all styles while school children differentiated. Concerning understanding both age groups found classical artworks to be the most and abstract artworks the least understandable. However, kindergarten children rated abstract artworks less understandable than school children and modern and classical artworks more understandable. For them, the classes of artworks seemed more distinct. This result is in accordance with the development of an aesthetic standard, which begins with some clearer criteria ("favoritism, beauty and realism")—what is depicted and recognizable—and progresses towards a broader aesthetic standard, which then also comprises abstract and modern art.

In our previous work (Leder et al., 2012) adult experts not only liked all artworks more, but also found all artworks more understandable and more emotional than non-experts, that is, nearly all ratings were higher with higher level of expertise, which we interpreted as a general effect of expertise. In the present study, this was not the case with children: as mentioned, elder children were

cognitive mastering of a less constrained class of artworks, such as abstract art, was not found to elicit a feeling of understanding. These results support the assumption that the stages of explicit classification and cognitive mastering (Leder et al., 2004) are based on content.

SEM analysis showed that different factors of the Leder et al. (2004) model—emotions, arousal, and understanding—strongly contribute to liking also in children. Given the assumption that art is a very subjective area of human culture this result is surprising. Furthermore, as Table 4 shows, the explained variance for “liking” of classical paintings was slightly lower for school children. This is an interesting finding, which is in accordance with the assumption of a process of differentiation through expertise—in this case with increasing age—in which individual differences (individual preferences and taste) become stronger. Processes of differentiation with increasing expertise were assumed by Leder et al. (2004) and support the notion of increasingly finer distinctions being essential for cultural differentiation (Bourdieu, 1979). These processes might become evoked when children enter school and receive art instruction. However, looking at the R^2 s for each art style and age group, this conclusion requires a more differentiated interpretation. Specifically, R^2 s for modern paintings were slightly and for abstract paintings considerably higher for older compared with younger children, which contradicts the idea of differentiation through expertise. Only for classic artworks were R^2 s higher for younger children. Thus, the process of differentiation seems to be restricted to appreciation of classic art.

SEM analysis strongly supports the hypothesis that emotions are important for aesthetic experiences (Scherer, Schorr, & Johnstone, 2001). Both groups heavily relied on emotions in their liking ratings, but these effects were weaker for older children. This result is in accordance with a transition from an affective based towards an increasingly cognitive and knowledge based sense of aesthetics, but underlines the importance of emotional processing as fundamental. The strong effect of emotion underlines the past decade’s assumption, that the aesthetic sense very much represents an emotional evaluation of the environment, which is a strong determinant of attitudes, presumably associated with the biological dichotomy of approach and avoidance (Chatterjee, 2013; Leder et al., 2004).

We also found clear evidence for the interplay between cognitive and emotional processes as assumed in the model of aesthetic appreciation (Leder et al., 2004). However, the case is restricted to modern artworks, presumably because the need to understand art is greatest when the content is somewhat ambiguous. Liking of these artworks was affected both by emotion and understanding. This is also in accordance with the mean values presented in Figure 1. While classical artworks were highly understandable, abstract artworks were not. Modern paintings were moderately understandable and understanding directly affected liking (but see age effects below). This is different from Gehlen’s (1960) claim that the need for interpretation in appreciating art should be particularly strong in abstract art. However, nowadays, abstract art is a widely established form of art. Thus, these findings might be due to effects such as educational background and knowledge. Therefore, explicit understanding is associated with emotional evaluation, which somehow corresponds to some naïve statements concerning the expressive function of abstract art.

The low effects of arousal are not in accordance with arousal models of aesthetics (Berlyne, 1970, 1974). In accordance with the assumption that modern and abstract art are particularly emotional, only school children showed such a differentiation

with art style and arousal in their arousal evaluations. This is supported by the SEM results. However, the generally low effects of arousal have to be interpreted with some caution, as it is not certain to what extent kindergarten children were able to evaluate arousal in a consistent manner. Future studies should aim at clarifying whether/when children are able to consistently evaluate arousal.

Conclusions

To summarize, by comparing responses to artworks of children of different age, we found that increasing age was associated with greater differentiation in the interplay of variables affecting art appreciation (Leder et al., 2004). These results are in accordance with a transition from an affective based towards an increasingly cognitive, knowledge based sense of aesthetics. The elaboration level that we observed in the comments by the school children is another hint toward the interpretation that elaborate knowledge plays an important role. With age the scope of what can be considered art and aesthetically pleasing seems to broaden, comprising abstract and ambiguous modern art. Also, the present study again underlines the importance of emotional processing as fundamental; as often assumed but now also empirically shown. Emotion seems to be the strongest predictor of art appreciation, also—and in particular—in younger children. In order to test hypotheses concerning the influence of emotional processing, future studies should consider directly varying the emotionality and pre-denied level of arousal of the artworks (Silvia & Brown, 2007). Other components assumed to be involved in aesthetic processing could also be considered. Examples of these include variables that differ individually, such as sensation seeking (Zuckerman, 1971), or artworks that explicitly represent (or are presented as having) different levels of ambiguity (Jakesch, Leder & Forster, 2013).

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Notes

1. (“Es ist einfach, aber trotzdem Kunst”, “Weil es so harmoniert, so frei”, “Weil es sehr modisch ist”, “Es ist sehr kreativ gemalt”).
2. *Color* (e.g., “... weil es rot ist”), *content* (e.g., “... weil da viele Bäume sind”), *atmosphere/impression* (e.g., “... weil es traurig ist”, “... weil es lustig aussieht”), *form/style* (e.g., “... weil es wie auf Holz gemalt aussieht”, “... weil es so verschwommen ist”), *favoritism* (e.g., “... Ich mag es, weil da Hunde zu sehen sind. Ich mag Hunde.”), *realism* (e.g., “... weil es wie ein Foto aussieht”).

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Appendix

List of Artworks (in the Order of Presentation)

Abstract.

1. Bram van Velde: Composition (1964)
2. Fiona Rae: Male Nurse
3. Gerhard Richter: C.B.
4. Hans Hartung: Painting T-54-16

Modern.

1. Jean Dubuffet: Limbour Prepared as a Chicken Dropping

2. Jeff Koons: Sandwiches
3. Markus Lüpertz: Black-Red-Gold-Dithyrambic
4. Chaim Soutine: Still Life with Fish and Pitcher

Classical.

1. Pierre-Auguste Renoir: Two Sisters (On the Terrace)
2. Claude Monet: Poplars, White and Yellow Effect
3. Paul Signac: Two Milliners in the Rue Du Caire
4. Adolph Menzel: The Balcony Room