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Finding meaning in art: Preferred levels of ambiguity in art appreciation

Martina Jakesch and **Helmut Leder**
University of Vienna, Vienna, Austria

Abstract

Uncertainty is typically not desirable in everyday experiences, but uncertainty in the form of ambiguity may be a defining feature of aesthetic experiences of modern art. In this study, we examined different hypotheses concerning the quantity and quality of information appreciated in art. Artworks were shown together with auditorily presented statements. We tested whether the amount of information, the amount of matching information, or the proportion of matching to nonmatching statements apparent in a picture (levels of ambiguity) affect liking and interestingness. Only the levels of ambiguity predicted differences in the two dependent variables. These findings reveal that ambiguity is an important determinant of aesthetic appreciation and that a certain level of ambiguity is appreciable.

Keywords

Meaning; Appreciation; Art; Ambiguity

Correct identification of objects in our environment and the resolution of ambiguity are required for successful perception. Consequently, our perceptual and cognitive systems are optimized for finding meaningful structures. Bruce, Green, and Georgeson (2003, p. 122) have stated, “Ambiguity generally does not arise in the real world, nor in most pictures.” However, there is one group of objects in our environment that might be an exception. From a psychological viewpoint, modern artworks are considered a class of real-world objects, which not only allow some degree of ambiguity (Leder, Belke, Oeberst, & Augustin, 2004), but might actually owe their value to their ability to elicit challenging states of ambiguity, arousal, and uncertainty (Kreitler & Kreitler, 1972). Therefore, modern abstract artworks are a class of objects that are particularly suited for investigating how ambiguity is appreciated.

Higher order cognitive processes, such as finding meaning and understanding, play important roles in the appreciation of art (Leder, Carbon, & Ripsas, 2006). These processes can be systematically investigated by presenting artworks along with supplementary information such as interpretive titles (e.g., Leder et al., 2006; Millis, 2001; Russell, 2003) or stylistic information (e.g., Belke, Leder, & Augustin, 2006; Cupchik, Sherek, & Spiegel, 1994). Millis (2001) found that aesthetic judgement ratings increased when “elaborative” titles were presented together with representational artworks. Using a similar approach, Russell (2003) concluded that future research should consider the influence of content and quality of accompanying information on the hedonic value of artworks. In this respect, Belke et al. (2006) presented style information with artworks and found an increase in

Correspondence should be addressed to Martina Jakesch, University of Vienna, Faculty of Psychology, Department of Psychological Basic Research, Liebiggasse 5, A-1010 Vienna, Austria. martina.jakesch@univie.ac.at.

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aesthetic appreciation. However, this effect was found only in nonexpert participants to whom the information was new, beyond their knowledge, and therefore helpful in finding meaning. Concerning the quality of additional information, Leder et al. (2006) varied presentation durations and the type of title and found that finding meaning corresponds to later stages in the processing of artworks (Leder et al., 2004).

How information affects appreciation of artworks through finding meaning depends on a complex interplay of perceptual and higher order processes, which evaluate the appropriateness of information for the processing of a specific artwork for a specific perceiver (Belke et al., 2006; Leder et al., 2004). Concerning higher order cognitive processes in art appreciation, Kreitler and Kreitler (1972, p. 23) argued that a stimulus acts as a cue after “it is subjected to a series of processes designed to determine its meaning”. Incomplete “cognitive orientation”— evoked through novel or surprising stimuli with various meanings —exaggerates tension. This tension could be relieved through determination of meaning.

In the present study, we employed a strategy that allowed the assessment of competing hypotheses concerning the effects of artwork information match. We presented abstract artworks along with varying numbers of explanatory statements and asked participants to indicate whether the statements matched the artworks. Matching was defined as a correspondence between the visual and the semantic or, in other words, a match between the representation and the verbal information that accompanied it. This allowed a test of whether the amount of perceived dissonant information, the number of supplementary statements, or a certain proportion of matching and nonmatching statements affects the appreciation of artworks.

The mere number of statements

One might expect that the more information accompanies a work of art, the more meaning is assigned to it. Particularly for abstract artworks, where no representational content is available, information is a necessary precondition for both understanding and aesthetic appreciation (e.g., Belke et al., 2006; Leder et al., 2006). In this case, the mere number of additionally presented statements would modulate aesthetic liking and/or interestingness. Thus, our first hypothesis was tested by analysing the number of statements presented with each artwork.

The quantity of matching information

In previous studies, statements about the way artworks were produced (Belke et al., 2006) and different kinds of titles (Leder et al., 2006; Millis, 2001; Russell, 2003) affected aesthetic processing. However, whether the perceivers found the information appropriate or matching the artwork has not been tested. It can be assumed that the effects of additional information might be stronger the more they subjectively match the artwork. For example, a participant may find that only two of the six statements presented with a painting subjectively matched the painting. Martindale (1984) argued that aesthetic appreciation is a joint consequence of activation and inhibition and that the number of associations determines aesthetic experiences. To address this activation explanation, our second hypothesis focused on the subjective match between each statement and the artwork. Consequently, we analysed the data according to the number of matching statements.

The proportion of dissonant information

Our third hypothesis was concerned with ambiguity. Artworks may be special because they are a class of objects for which ambiguity cannot be fully resolved (Leder et al., 2004). This

may be one explanation for the ubiquity of art throughout human culture. Specifically, art allows the "playful" acceptance of states of mind that are characterized by more tension than is typically appreciated in other everyday experiences. In this respect, Kreitler and Kreitler (1972) described that "the more in art" is often represented by the dissonance between what is conveyed and one's own ideas. The presentation of dissonant information promotes a deeper and more elaborative cognitive orientation. Similarly, Berlyne (1971) proposed that conflicting information such as ambiguity affects arousal, which might be modulated by cognitive effort. Zeki (1999, p. 26) even claimed that ambiguity "is a characteristic of all great art". He also proposed that a state of ambiguity might be particularly pleasing as long as some valuable information and a certain amount of meaning are assured.

There is evidence that a moderate amount of ambiguity/uncertainty might be preferred. Munsinger and Kessen (1964) found that an intermediate amount of cognitive uncertainty was preferred. Similarly, Nicki, Forestell, and Short (1979) reported higher values for "interestingness" and "pleasingness" for original Escher figures than for the altered more ambiguous and less ambiguous versions. Furthermore, Cupchik (1994) referred to Fechner's "principle of the aesthetic middle", which states that people prefer a moderate degree of arousal, a state of neither overstimulation nor dissatisfaction. Thus, it could be assumed that a certain level of dissonant information or ambiguity enhances aesthetic appreciation. Specifically, a moderate amount of coherent/dissonant information may be preferred over fully coherent or fully dissonant information.

The term *ambiguity* in this study is used to represent a kind of sensual or emotional/affective ambiguity. Thus, ambiguity is not defined as an object inherent feature. We were interested whether liking and interestingness ratings for paintings differ according to varying proportions of subjectively matching and nonmatching statements. Ambiguity is therefore defined as "*subjective, emotional ambiguity*" in the sense of arousal theory. This is similar to Nicki, Lee, and Moss (1981), who used the notation term "subjective ambiguity" to describe their edited cubist paintings (blurred versions represented high ambiguity and original versions represented low ambiguity). We are aware that this definition may not be fully coherent with common taxonomies for *ambiguity* (e.g., Kris & Kaplan, 1952).

In the present study, data were analysed with respect to these three hypotheses. We compared different amounts of information with different levels of ambiguity as defined by individually judged dissonant or coherent information (sampled, depending on the sampling procedure, over items or participants). We expected that the differential effects on the two dependent variables, as revealed through the three analyses, would indicate which of the hypotheses could best account for differences in aesthetic judgements. Moreover, as aesthetic liking and interestingness might depend on a complex interplay of perceptual and higher order processes, it can be assumed that the more variation there is in perceptual dimensions, the higher the probability that higher order effects due to individual preferences will be concealed. This might particularly be the case for certain colours in the paintings. Thus, in a between-subjects design, artworks were presented not only in colour but also in greyscale versions in order to reduce the possibility that differences in colour preferences conceal the effects of the experimental variables (as assumed by Hekkert & van Wieringen, 1996).

Method

Participants

A total of 36 undergraduate psychology students (33 females) from the University of Vienna participated in the study for course credit. Their mean age was 23.14 years, and none had a background in art.

Materials

Combinations of pictures and auditorily presented statements were used in this experiment. A total of 18 paintings were selected for the experiment (see Appendix), with the selection being based on a result of a prestudy in which 26 students (mean age: 27.95 years) rated 64 artworks according to complexity and mood content. The artworks were unfamiliar and were of a distinctive style. In order to keep the influence of mood content and complexity as constant as possible, the stimuli were in the mid range regarding both variables. The artworks were presented on a BenQ 18-inch CRT monitor with a screen resolution of 1,024 × 768 pixels in full colour or greyscale. The experiment was conducted using PsyScope (Cohen, MacWhinney, Flatt, & Provost, 1993).

The statements for each painting were selected from artists' monographs and various art books and were used to interpret or describe the specific painting or similar paintings made by the artist (same stylistic period). For example, for van Doesburg's painting, these 6 statements were used: "elementarism", "concrete art", "homogeneous", "static", "constructed", "rigorous". The selection process was similar to that described for the artworks. A total of 6 out of 12 statements with average mood content and an appropriate match were chosen for each image according to a prestudy in which ratings of 15 volunteers (mean age: 29.27 years) were collected.

The audio files were created as follows: One sample with all terms was recorded in a studio using an AT4050 microphone at 44.1 kHz. Wave renaissance vox, wave renaissance IQ, and PSP Vintage Warmer filters were used to establish a soft and unobtrusive voice. Afterwards, pseudorandomized individual samples for each painting were cut using WaveLab5. For each artwork, 12 versions were generated—6 versions with six statements, 4 versions with four statements, and 2 versions with two statements. In the condition with six statements, audio presentation occurred at 5, 15, 25, 35, 45, and 55 s after stimulus onset. In order to control for position effects, the sequences of statements were partially balanced by producing six different versions. Audio files for the two- and four-statement conditions were generated in the same manner. In the condition with four statements, presentation occurred after 15, 25, 35, and 45 s. In the version with two statements, presentation occurred at 20 and 40 s after stimulus onset. This format was used for all 216 audio samples (12 × 18). The auditory statements were presented in pseudorandomized order using the loudspeakers of the monitor.

Procedure

Testing took place in a dimly lit laboratory. Participants sat in front of the computer (screen distance about 60 cm). The instructions and the welcome texts were presented on the screen, and the response keys were highlighted on the keyboard. Participants were randomly assigned to the two experimental groups (colour/greyscale). During the experiment, 18 paintings were presented on the screen in random order for 60 s each. Depending on the statement condition, two, four, or six statements were auditorily presented. The participants were instructed to judge whether each statement matched the painting ("Yes") or not ("No"). After each statement, the participants provided their judgements verbally and were recorded by the experimenter. After each presentation, participants were asked to rate the painting according to liking and interestingness on 9-point scales (1, not at all; 9, very much). Participants' mood states were measured before and after the experiment using the German versions of the Positive and Negative Affect Schedule (PANAS; Krohne, Egloff, Kohlmann, & Tausch, 1996). Lastly, participants completed a questionnaire about their expertise and interest in art (as in Belke et al., 2006). The analyses of the art interest and expertise data did not reveal significant effects or interactions. Therefore, these factors are not reported in the Results section. Analyses of the affective states data only revealed one significant effect: a

significant decrease in positive affect (according to PANAS) before and after the experiment in the greyscale group, $t(17) = 3.35$, $p \leq .01$.

Results

Separate repeated measurement analyses of variance (ANOVAs) for each of our three hypotheses were run. In each Results section, the effects for *liking* are described first, followed by the effects for *interestingness*. In all analyses, *colour* was set as a between-subjects factor. Mean values for all analyses are shown in Figure 1.

Effects of the number of statements

Mean data of each participant were submitted to two mixed repeated measurement ANOVAs. Colour was set as a between-subjects factor and number of statements (2, 4, and 6) presented with each artwork as a within-subject factor. Two analyses were performed for each of the two dependent variables.

Concerning liking, the ANOVA revealed a main effect of colour, $F(1, 34) = 4.70$, $p = .04$, $\eta_p^2=0.12$. There was no main effect of number of statements, $F(2, 68) = 0.15$, $p = .87$, $\eta_p^2=0.01$, nor an interaction between colour and number of statements, $F(2, 68) = 0.31$, $p = .74$, $\eta_p^2=0.01$. There was an identical pattern of results for interestingness, with a main effect of colour, $F(1, 34) = 6.66$, $p = .01$, $\eta_p^2=0.16$, with the coloured version being rated as generally more interesting. Again, there was no main effect found for number of statements, $F(2, 68) = 1.29$, $p = .27$, $\eta_p^2=0.04$, and no interaction between the number of statements and colour, $F(2, 68) = 0.10$, $p = .91$, $\eta_p^2=0.00$. Pairwise comparisons revealed only one effect; with six statements, the coloured paintings were significantly liked more than the greyscale versions ($p = .02$, Bonferroni adjusted).

Effects of the quantity of matching information

In order to test whether the number of matching statements determined differences in aesthetic preferences, paintings were classified according to whether they received zero or one (low match), two or three (medium match), or four or five (high match) positive responses (based on the participants' individual responses to the statements as described in the Procedure section). The assignment of a painting to one of the classes, therefore, differed on an individual basis. By doing so, we were able to compare only the number of subjectively matching statements. Participants' liking and interestingness ratings were subsequently reorganized according to these three new statement groups.

An analysis of the liking ratings revealed no main effect of the factor matching statements, $F(2, 104) = 2.44$, $p = .08$, $\eta_p^2=0.05$, or colour, $F(1, 52) = 0.63$, $p = .42$, $\eta_p^2=0.0$, but a significant interaction between matching statements and colour, $F(2, 104) = 3.26$, $p = .03$, $\eta_p^2=0.06$, which indicates that the richer representation (through colour) in combination with the high number of matching statements influenced appreciation in a positive way. However, there were no significant effects in the interestingness data (all $p > .1$) Thus, as shown in Figure 1, the number of matching statements seems to have had a small impact as suggested by Martindale (1984), but the effects were rather small and inconsistent.

Effects of proportion of dissonant information

To analyse whether the proportions between matching and nonmatching information as an operationalization of ambiguity was critical, the raw data of the matching ratings were

transformed into percentage scores. Each artwork was treated as belonging to one of the categories based on mean values (sampled over all conditions and participants). This procedure enabled the examination of all data ratings of the participants within one analysis. Depending on the percentages, the 18 paintings were categorized into three groups: a group with the lowest proportion of nonmatching statements and a high proportion of matching statements ($M = 76.34$); a second group with nearly equal values of matching/nonmatching statements ($M = 64.57$); and a third group with a low proportion of matching statements and a high proportion of nonmatching statements ($M = 44.89$). These groups were analysed as three levels of ambiguity.

Two repeated measurement ANOVAs were performed (sampled over participants) with level of ambiguity (low/medium/high) as within-subject factor and colour as between-subjects factor, and liking and interestingness ratings as dependent variables. Both analyses revealed significant main effects of level of ambiguity, $F(2, 68) = 7.13$, $p < .01$, $\eta_p^2 = 0.16$ for liking, and $F(2, 68) = 16.27$, $p > .01$, $\eta_p^2 = 0.31$ for interestingness. Both dependent variables received higher ratings in the coloured versions, $F(1, 34) = 4.70$, $p = .04$, $\eta_p^2 = 0.11$ for liking, and $F(1, 34) = 6.66$, $p = .01$, $\eta_p^2 = 0.15$ for interestingness. Interestingly, these effects seemed to be “additive”, as the curves for both colour groups showed the same pattern. Most importantly, picture–statement combinations with a medium level of ambiguity were rated significantly higher than picture–statement combinations with either low or high level of ambiguity. Specifically, in the greyscale versions, paintings with medium level of ambiguity were liked more than paintings with high level of ambiguity ($t = 0.83$, $p = .01$). For coloured paintings, a similar effect was found, although it only approached significance ($t = 0.60$, $p = .06$). Regarding interestingness ratings for the greyscale paintings, there were significant differences between low and medium as well as between medium and high levels of ambiguity ($t = 0.98$, $p = .004$, and $t = 0.81$, $p = .01$, respectively).

Discussion

The findings of the present study clearly favour the hypothesis that the quality of higher order information is more relevant to art appreciation than the number of statements presented along with an artwork. Processing of abstract artworks is a very complex task with a variety of confounding variables. Berlyne (1974, p. 181) noted that “any two paintings, for example, must differ in at least a thousand respects”. All of these variables could potentially cause differences in aesthetic responses to art (Leder et al., 2004). The present study aimed to find a general feature of higher order cognition. By comparing three different analyses, we identified which higher order cognitive aspects were more in accordance with differences in our data. Neither the number of statements presented together with artworks, nor the mere number of matching and thus appropriate statements determined clear differences in liking and interestingness. However, in accordance with the idea that modern art somehow allows the positive experience of ambiguity, artworks with a moderate ambiguity level— including matching and nonmatching terms—were liked most and were found to be most interesting. The interestingness ratings showed larger differences between the conditions and tended to have higher ratings in general. This is consistent with the assumption that in modern art, interest may be more important than beauty, with the latter as a concept that was nearly abandoned in 20th-century art (Leder et al., 2004). These findings may account for the elaboration of cognitive orientation through dissonant information (Kreitler & Kreitler, 1972). In general, the inverted U-shaped function between levels of ambiguity and the interestingness data corresponds to Berlyne’s arousal theory (1971). In the present experiment, “uncertainty” may have mediated the interestingness ratings for the

different levels of ambiguity. Thus, a comparison between the present experiment and the study by Munsinger and Kessen (1964) can be made.

Using abstract modern artworks, we demonstrated that moderate levels of ambiguity are not only tolerated but also appreciated. In this condition, ambiguity elicited higher aesthetic judgements. This is evidence that art is able to elicit special experiences, such as the enjoyment of ambiguity when viewers perceive and attempt to understand artworks. In other objects and domains, such ambiguity would be seen as threatening and may not be appreciated. Artworks, as shown here, enable the investigation of when and how ambiguity is appreciated. Thus, investigations of such higher order cognitive states are essential for understanding aesthetic pleasure and for developing a comprehensive psychology of the arts.

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APPENDIX

Lists of artworks and artists

1. Auerbach, Frank. Artist . ca 1960. Title unknown [Oil on canvas].
2. DeKooning, Willem. A tree in Naples. 1960 Artist . Oil on canvas.
3. Fautrier, Jean. Geiselkopf. 1944 Artist . Mixed technique—palette knife and paper on canvas.
4. Frankenthaler, Helen. Mauve district. 1966 Synthetic polymer paint on canvas.
5. Hartung, Hans. 1989:R34. Artist .
6. Klein, Yves. Firepainting—untitled. 1961 Artist .
7. Klein, Yves. Grande anthropophagie bleue, hommage à Tennessee Williams (ANT 76). 1960 Artist .
8. Kline, Franz. New York, NY. 1953 Artist . Oil on canvas.
9. Kupka, František. Studie zu Amorpha, Fuge in zwei Farben. 1912 Artist . Gouache and ink on paper.
10. Lasker, Jonathan. Public love. 1990 Artist . Oil on canvas.
11. Mondrian, Piet. Pier and ocean (sea in starlight). 1914 Artist . Charcoal and white watercolour on paper.
12. Motherwell, Robert. Elegy to the Spanish Republic. 1965–1967 Artist . Oil on canvas.
13. Riopelle, Jean-Paul. Blizzard. 1954 Artist . Oil on canvas.
14. Sugai, Kumi. Untitled. 1954 Artist . Oil on canvas.
15. Tapies, Antoni. Bläť Billende med Cirkelbue. 1959 Artist . Oil on canvas.
16. Tomlin, Bradely Walker. Number 20. 1949 Artist . Oil on canvas.
17. Vieira da Silva, Maria Elena. Dédale. 1975 Artist . Oil on canvas.
18. Van Doesburg, Theo. Rhythm of a Russian dance. 1914 Artist . Oil on canvas.

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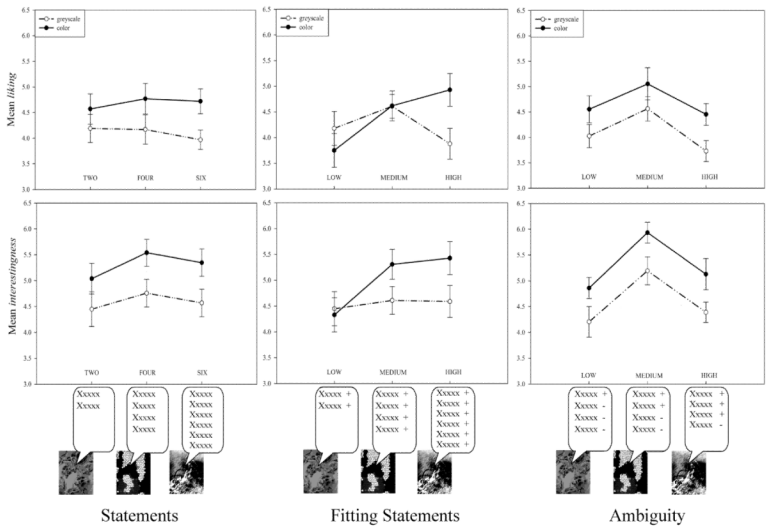

Figure 1.
Results overview of all three analyses (left: effects of the number of statements; middle: effects of the quantity of statements; right: effects of the proportion of matching/ nonmatching statements). Error bars indicate the range of ± 1 standard error of the mean.

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