THE "STYLE SCHEME" GROUNDS PERCEPTION OF PAINTINGS 1,2

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Summary.—We studied the formation of style scheme (identification of the style that characterizes an artist) presenting 100 participants aesthetic visual stimuli. Participants were Spanish university students who volunteered: 72 women, 28 men of mean age 22.8 yr. Among those 50 were enrolled in History of Art and 50 students in Psychology. Stimuli belonged to different categories—High Art (pictures of well-known artists, like Van Gogh)/Popular Art (decorative pictures like Christmas postcards) and Representational (pictures with explicit meaning content, like a landscape)/Abstract (pictures without explicit meaning content, like Pollock’s colored stains). Analysis using Signal Detection Theory techniques focused on how participants discriminate representational and abstract pictures. With High Art stimuli, participants can better discriminate representational paintings than abstract ones. However, the difference in discrimination between representational and abstract pictures diminishes among participants studying History of Art. It seems that prior education in art favors forming style schemes and to some extent enables the participant to detect the “meaning” in High Art abstract paintings.

According to Tversky and Kahneman’s model of judgment under uncertainty (1974), the features of stimuli such as artistic ones have two kinds of salience, intensity and diagnostic. Features prominent for their intensity possess high potential for arousal, while features being relevant for discrimination facilitate building categories. Categorical models and motivational—based on arousal—models usually compete as an explanation for aesthetic experience (Boselie, 1991). However, Whitfield (2000) pointed out the presence of both kinds of salience, intensity and diagnostic discrimination in art stimuli such as Cubist paintings. A collative feature, such as incongruence, may be considered prototypical of this type of art. Cubism uses spatial distortion of forms as a common characteristic shared by painters like Braque and Picasso in their Cubist periods. Aesthetic responses are not, according to Whitfield, a simple phenomenon generated in a one-dimensional manner.

In accordance with Whitfield’s view of the complexity and variety of aesthetic response, highly diverse stimuli taken from the real world of art

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were used in the present experiment to analyze aesthetic perception. To accomplish this, two variables have been considered. First, the range of the aesthetic content of the stimuli, related to intensity salience. Following a distinction of artistic levels which figures in experimental studies such as that of Winston and Cupchik (1992), High Art/Popular Art stimuli have been used. High Art means pictures made by well-known artists (Rembrandt, Van Gogh, Bacon, and so forth) that can be found in museums. Popular Art means pictures that are used with decorative purposes like Santa Claus images displayed on Christmas postcards. The second variable was the presence or absence of semantic content—with a clear diagnostic salience—using both representational and abstract stimuli. Fechner's use (1871) of simple geometric stimuli in experimental aesthetics was criticized by Arnheim (1966), who pointed out the inconveniences of an excessive reduction of the complexity of the forms. Using stimuli that belong to the real world of art, this problem has been avoided.

Techniques proceeding from Signal Detection Theory were used in the experiment. Signal Detection Theory analyzes slightly different visual stimuli, presenting some of them as targets and the others as distractors. Targets are displayed in a first session of the experiment, establishing some memory trace in participants. In a second session, participants, faced with targets and distractors, must say whether each stimulus has been previously displayed. Since distractors are quite similar to targets, in some cases memory forces one to identify a distractor as “seen” (false alarm).

The basic idea underlying our experiment’s design differs slightly from the one used in Signal Detection Theory. When aesthetic stimuli are considered, the memory trace may be found in the form of content or in style. These two variables, subject matter and style in paintings, were used by Cupchik, Winston, and Herz (1992) to examine how judgments of differences are made by observers. They found subject matter is more easily judged than style. However, both variables influence visual perception of pictures. The target is thus assumed to leave a memory trace of the picture’s theme or a memory trace of the painter’s style. This can happen either because the distractor’s content is close to the target’s content (two similar urban scenes, for example) or because an artist’s characteristic style (as can happen, for instance, with Impressionism, Cubism, or Pop-Art) leads to the belief that the distractor has already been seen.

It is important to distinguish between both types of memory, style and content, when studying the participant’s aesthetic answer. To do so, the notion of same-content stimuli and same-style stimuli must be clearly defined. Pilot experiments carried out indicated the difficulty of getting a reliable criterion of what “same content” is. If “same content” means two similar landscapes painted by different artists, using one of them as target and the other
as distractor, participants distinguish between them very easily (their discrimination is very high). The influence of style in identifying a stimulus is very strong. For example, there is an abyss between Velázquez's painting of the "maids of honor" of the Royal Family (Meninas, 1656) and Picasso's version of the same. It might be an exaggerated example, but it correctly identifies the nature of the topic. Thus, the stimuli chosen as distractors need to belong to the same artist as the target, corresponding to the same period and also presenting a similar content. But in this case we find that, by definition, the style of the targets and distractors will also be the same. How can the memory trace left by the style be detected in this case?

To study that memory trace, the difference between representational and abstract paintings has been used. We assume that abstract paintings, which lack a represented theme, leave a memory trace related only with the style scheme. Representational pictures will also cause the appearance of a style scheme, as artists who paint representational pictures clearly have a style. In a parallel way, abstract paintings have some content. Mondrian's most representative paintings can be described as "colored squares" and Pollock's as "stains," for example. Given that in all cases the distractors are chosen because they have a certain similarity with the targets (even in abstract paintings), the aforementioned problem will arise. However, the comparison between abstract and representational stimuli allows the formulation of well-grounded hypotheses. By their nature, abstract paintings have a much less explicit "content" than representational paintings (that is why they are called "informalist" in the jargon of art galleries). It can be maintained that, comparatively speaking, style should be more relevant in abstract High Art stimuli, whereas content should be more salient in representational High Art stimuli. Next, a means must be found to assess experimentally whether these expectations are accurate.

The experimental procedure is based on standard methods in the study of discrimination and, in particular, the capacity to distinguish between targets and distractors. What should happen, in theory, with discrimination in each case? "Style" has been defined as that which corresponds to the paintings from a given period in an artist's work. The distractors have the same style as the targets because they have been chosen that way: pertaining to the same artist and to the same period. If the only memory trace of the participants corresponded to this style scheme, discrimination between different works would not be possible, i.e., should equal zero. Otherwise, it would mean there is something that allows the participants to detect they are seeing a distractor, a stimulus they have not seen before. That "something" is the presence of some precise content details that are different in the target and the distractor. It is not that the content changes in a radical way, because, in that case, the distractors would not accomplish their function:
there would not be any false alarms. But content varies enough to allow correct rejections.

Thus, the theoretical assumption is that discrimination between targets and distractors is due to the content of the stimuli in a comparison of two works by the same artist from the same period. If this notion is correct, those stimuli with a greater semantic content (representational art) will allow greater discrimination than the stimuli with less semantic content (abstract art), in which the style scheme will introduce a high confusion between targets and distractors.

This experiment was designed in accordance with the aforementioned assumption. The aim of this experiment was to detect, through the study of familiarity and discrimination, the formation of the style schemes by participants with and without academic artistic learning through the study of discrimination. The general hypothesis was established assuming the groups of participants would be affected by the style schemes, but in different ways. The lack of content in abstract stimuli would cause all participants to discriminate between these stimuli poorly. But participants with education in Art History should show greater discrimination than subjects with no art education.

The relationship between the personal interest in art by a participant and the kind of university studies that the same participant is following seems quite controversial. Several other background circumstances, such as, family education, socioeconomic status, and so forth, would influence as much as studies at least. As Seifert (1992) pointed out, “naive art observers” are sensitive to art and have a basic knowledge of art. When we speak of naive art observers, it doesn’t mean that they do not have sensibility for art. However, in an experiment (not yet published) we studied the semantic judgments given by students of Art History and Psychology to the stimuli used here. We found that students educated in Art History rated High Art stimuli significantly higher than uneducated participants. In particular, the highest differences appeared for High Art abstract stimuli. The categories used in the experiment for semantic judgment were that of “beautiful,” “pleasant,” “original,” and “interesting.”

Two specific hypotheses were established. The first hypothesis (H₁) was that lack of content would be associated with poorer discrimination of abstract stimuli by all participants than representational stimuli. The second hypothesis (H₂) was that education in Art History would partly counterbalance that tendency, allowing a better “semantic comprehension” of the abstract art. Therefore, participants educated in Art History would discriminate abstract stimuli better than participants without such education.
Method

Participants

A sample of 100 voluntary participants, students at The University of Balearic Islands (in the last four terms of their degree), was divided in two groups according to their previous artistic education. Artistic education refers to the competence acquired by participants studying Art History compared to psychology students without art education. The 50 psychology pupils (38 women, 12 men) in the No experience group, and 50 Art History pupils (34 women, 16 men) as the Experienced group were selected (M = 22.8 yr., SD = 1.9).

Material

One hundred and four images, each including a reproduction of a single picture, were the diverse aesthetic stimuli. Color was eliminated by selecting the option “gray scale” in the Adobe Photoshop application.

The pictures were classified in two large blocks which corresponded to the “High Art” and “Popular Art” conditions. High Art pictures were catalogued works by famous painters from which the signature was removed. Very conspicuous works, like the already mentioned interpretation of ‘Meninas’ by Picasso, were excluded. This way, Eysenck’s indications (1940) regarding the need for eliminating distortion factors were taken into account. Eysenck pointed out that a too well-known picture can be easily recognized not because of its aesthetic value but because it is too conspicuous. It seems clear that Leonardo da Vinci’s Gioconda could be used either as a target or as a distractor.

Half of the High Art stimuli were representational and half were abstract, following the common criteria as to which works are figurative (having explicit content, like landscapes or still life) and which are not (without explicit content).

The second block of pictures, Popular Art, was obtained from the ‘Master Clips’ Premium Image Collection (IMSI http://www.imsisoft.com) commonly used for industrial design. They are images not usually considered as High Art, usually not signed, but used for publicity, book illustrations, fabrics, posters, etc. As in the previous case, the stimuli in this block were divided into Popular representational and Popular abstract.

Overall, the material consisted of 104 black and white 14 × 10-cm. sheets, surrounded by a black line frame. Forty-eight of them formed the High Art block; 48 of them formed the Popular Art block; 8 of them (4 of High Art and 4 of Popular Art) were added to eliminate primacy and recency effects.

The High Art block was divided in two categories, 24 Representational
Artistic stimuli and 24 Abstract Artistic stimuli. Following the same criterion, the Popular Art block was divided into 24 Representational Popular Art stimuli and 24 Abstract Popular Art stimuli. Half of the stimuli in each category were targets and the other half were distractors. The purpose was for each target to have a specific distractor defined as follows. A distractor for each High Art representational stimulus had similar content, the same author, and was from the same period. A distractor for each High Art abstract stimulus was by the same painter and from the same period. A Distractor for each Popular Art representational stimulus and Popular Art abstract stimulus pertained to the same series in the Master Clips catalogue and was of similar content.

Stimuli were presented using a Sony RVP 4015QM monitor, a Pentium 133 computer with Windows 95 Operating System and by means of the Director application (similar to PowerPoint). Data were initially analyzed in a Power Macintosh G3 using an Excel 5 worksheet and statistical analysis was carried out using the SPSS statistical package.

Procedure

The participants were divided into different subgroups and collectively presented as two tasks carried out in two different sessions which were separated by a retention interval of 24 hours. The presentation was carried out in an isolated and partially illuminated room (luminances of 282 lx and 276 lx, respectively).

Answer sheets were given to the participants for the recognition task. They had to tick the answer as yes or no in each of the 96 squares corresponding to the 96 recognition stimuli, to indicate whether they had previously seen the picture.

Learning phase.—In the learning task participants had to look carefully at each of the 48 pictures described as targets and randomly presented. The stimuli were projected one at a time for 4 sec., with a gray masking screen of 1 sec. appearing after each one. The stimuli were randomly ordered for each subgroup of participants in the learning session. Furthermore, four initial images and four final images (similar to those of the four stimuli types High Art representational, High Art abstract, Popular Art representational, and Popular Art abstract) were presented at this stage but not in the next one to eliminate primacy and recency effects. Therefore, a total of 56 stimuli were presented during the learning stage.

Retention phase.—The retention interval was 24 hours, given that pilot studies found that shorter retention intervals left memories so strong that participants made few mistakes at retention. In that phase the stimuli (targets and distractors) were presented for 3 sec., followed by a masking screen of 2 sec.
The recognition task consisted in presenting the participants with the same 48 target sheets they had seen during the learning task plus the 48 specific distractors (one for each target) in a random order different from that used during the learning phase and followed by a masking screen. For each stimulus subjects were asked to answer yes or no to indicate whether they had seen it in the previous session.

**Results**

Signal Detection Theory was applied to obtain the parameter of discrimination $d'$ in the different conditions. Results of the $d'$ of the High Art Representational and High Art Abstract stimuli for the total sample appear in Fig. 1.

![Graph](image)

**Fig. 1.** $d'$ by blocks for high and popular art that is representational (□) and abstract (○)

The $d'$ of High Art Representational stimuli for the total sample is clearly higher than the $d'$ of High Art Abstract stimuli, and the difference is significant ($t_{96} = 2.75, p = .007$). This result supports Hypothesis H1, which predicted that participants can discriminate target stimuli from distractors.
better in the High Art Representational condition than in the High Art Abstract condition. There was, however, no significant difference in the $d'$ for the Popular Art conditions. As Fig. 1 indicates, the differences between Representational and Abstract in the Popular Art stimuli were not significant ($t_{99} = -0.94$, ns). The results for the Popular Art block did not support $H_1$.

The second hypothesis referred to higher semantic comprehension of abstract art by Art History students, which would lead to significant differences in discrimination of the abstract pictures.

Experimental results indicate that for participants with no art education the differences between the $d'$ of High Art Representational and Abstract stimuli were significant ($t_{49} = 2.09$, $p = .04$). However, participants with Art History education discriminated High Art Representational and High Art Abstract stimuli more closely so the difference was not significant ($t_{49} = 1.76$, ns). Thus, the data support Hypothesis $H_2$.

![Graph showing $d'$ for those with and without art education for representational (Δ) and abstract (◊) art.](image)
DISCUSSION

From the results, several conclusions can be suggested about visual perception of complex artistic stimuli beyond simple geometric forms. The results also indicate the way in which art education may possibly introduce changes in that perception.

Hartley and Schwartz’s experiment (1966) showed that participants, when making aesthetic judgments, act coherently with their self-reported personality characteristics. A positive and significant correlation was found between the concept participants had of their own personality, the ratings they gave the stimuli, and the ratings a person would award if that person had similar personality features to those which were self-assigned. An important aspect of the present experiment was having recorded as discrimination, an objective measure of the response. It may be that participants with previous education in Art History or art education rated the stimuli in a way they thought students like themselves should rate the different types of art. Using the techniques of Signal Detection Theory, a memory that is more objective and, to a great extent, free of distortions pointed out by Hartley and Schwartz, appears to be present.

The presence of style schemes in abstract artworks and the influence of content in the representational ones is supported by experimental data regarding the High Art block. However, the Popular Art poses an anomaly that needs to be explained.

The choice of Popular Art Abstract stimuli included, almost entirely, geometric drawings and had, therefore, much more defined forms than High Art Abstract stimuli. This was necessary to distinguish among abstract stimuli, between the High Art ones and Popular Art stimuli. Having eliminated color and used a short presentation time, the task of differentiating between a High Art Abstract stimulus and a Popular Art one becomes very difficult unless geometric forms are used. But if the distinction between style and content is correct, these geometric forms, for the most part present in the case of Popular Art stimuli, have quite a marked semantic content—“spirals,” “squares,” etc. Under these conditions participants must discriminate the stimuli relatively well, as the experimental results indicate. For this reason the comparison of the discrimination of representational and abstract stimuli by students of Art History and students of Psychology has been limited to the case of High Art.

The artists’ style is responsible in all cases for the presence of a memory trace transferred from the targets to the distractors, and so yielding false alarms. This phenomenon seems to be part of the general nature of human aesthetic perception. University education in Art History, on the other hand, allows better identification of semantic content in High Art abstract artworks. Targets and distractors are similarly identified (no significant differ-
ence in High Art Representational and High Art Abstract stimuli). Since discrimination is related to the capacity to identify the "meaning" of a picture, participants with Art History education succeeded in finding semantic content in the selected High Art Abstract artworks.

REFERENCES


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